

**University of Tennessee  
Department of Medicine  
Nephrology Fellowship Training Program**

**I. Program Narrative and Overall Program Objectives:**

The Nephrology fellowship requires two years of training. The program is committed to provide each trainee with the skills necessary to acquire competence in all aspects of Nephrology. The program is designed to challenge and stimulate the trainee by involvement in the full breadth of the highest quality patient care in Nephrology, in nephrologic research, and in teaching medical residents and students the fundamentals of the medical aspects of renal diseases. It is anticipated that the fellows who successfully complete this program will be fully prepared to pursue either a career in academic Nephrology or in clinical Nephrology practice.

Both specific clinical skills and the knowledge for the prevention, evaluation and management of nephrologic diseases must be acquired to successfully complete the program, and to be recommended for certification by the faculty. The clinical experience must include observing and managing patients with the full spectrum of kidney diseases, acquiring the latest information from both the Nephrology literature, and by interacting with the faculty and other colleagues in conferences and seminars, bedside rounds, and in informal discussions. It is expected that each trainee will be motivated to pursue independent programs of reading with the guidance of faculty, with the prepared syllabi for the training program, and with the stimulus of patient problems and research questions.

Each fellow will be expected to participate in either a basic or clinical research experience during the two years. Although some fellows will become very involved in asking and pursuing research questions, the primary purpose of this requirement is for each fellow to acquire the basic skills necessary in order to ask appropriate research questions, learn what common methodologies and research designs are necessary to answer specific questions, and, more importantly, gain the experience necessary to critically evaluate research data in the literature with a healthy skepticism.

The specific program requirements for residency education in Nephrology, as published by the ACGME, are shown below (pages 3-7). The University of Tennessee Nephrology training program is designed to adhere to these guidelines.

**General Nephrology Goals and Objectives**

By the end of the two year Nephrology residency program, all residents are expected to expand and cultivate skills and knowledge learned during previous training and to achieve the following objectives based on the six general competencies. The resident should exhibit an increasing level of responsibility and independency as he or she progresses throughout the program.

| Competency   | Required Skill(s)  | Teaching Method(s)                 | Formative Evaluation Method(s)                | Frequency of Evaluation |
|--------------|--|------------------------------------|---|-------------------------|
| Patient Care | <b>GENERAL OBJECTIVES</b>  |                                    |   |                         |
|              | Communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families. | Clinical Teaching<br>Role Modeling | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |
|              | Gather essential and accurate information about their patients.  | Clinical Teaching<br>Role Modeling | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |

| Competency   | Required Skill(s)  | Teaching Method(s)  | Formative Evaluation Method(s)                                | Frequency of Evaluation             |
|--|--|---|---|-------------------------------------|
|  | Make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgments. | Clinical Teaching<br>Journal Club<br>Lectures<br>Conferences<br>Grand Rounds<br>Role Modeling | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|  | Develop and carry out patient management plans.  | Clinical Teaching<br>Lectures<br>Role Modeling  | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|  | Counsel and educate patients and their families.   | Clinical Teaching<br>Role Modeling  | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|  | Use information technology to support patient care decisions and patient education.  | Clinical Teaching<br>Role Modeling<br>Self Directed Learning                                  | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|  | Perform competently all medical and invasive procedures considered essential for the area of practice.   | Clinical Teaching<br>Role Modeling<br>Simulations   | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|  | Provide health care services aimed at preventing health problems or maintaining health.  | Clinical Teaching<br>Self Directed Learning<br>Role Modeling                                  | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|  | Work with health care professionals, including those from other disciplines, to provide patient-focused care.  | Clinical Teaching<br>Role Modeling  | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|  | <b>SPECIALTY SPECIFIC OBJECTIVES</b>   |   |   |                                     |
| See individual rotations for detailed list of patient care objectives. |  |   |   |                                     |
| Medical Knowledge  | <b>GENERAL OBJECTIVES</b>  |   |   |                                     |
|  | Demonstrate an investigatory and analytic thinking approach to clinical situations.  | Clinical Teaching<br>Journal Club<br>Conferences<br>Lectures                                  | Clinical Rating Form<br>Written Exam                          | Monthly<br>Biannually               |
|  | Know and apply the basic and clinically supportive sciences  | Grand Rounds  | Clinical Rating Form  | Monthly                             |

| Competency                              | Required Skill(s)  | Teaching Method(s)  | Formative Evaluation Method(s)       | Frequency of Evaluation |
|---|--|---|--------------------------------------|-------------------------|
|   | which are appropriate to their discipline.   | Board Reviews<br>Journal Club<br>Conferences                          | Written Exam                         | Biannually              |
|   | <b>SPECIALTY SPECIFIC OBJECTIVES</b>   |   |                                      |                         |
|   | See individual rotations for detailed list of medical knowledge objectives.  |   |                                      |                         |
| Practice Based Learning and Improvement | <b>GENERAL OBJECTIVES</b>  |   |                                      |                         |
|   | Analyze practice experience and perform practice-based improvement activities using a systematic methodology.  | Research Project<br>Lectures/Seminars<br>Conferences<br>Role Modeling | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|   | Locate, appraise, and assimilate evidence from scientific studies related to their patients' health problems.  | Journal Club<br>Research project<br>Clinical Teaching                 | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|   | Obtain and use information about their own population of patients and the larger population of patients from which their patients are drawn.                     | Journal Club<br>Clinical Teaching<br>Lectures/Seminars                | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|   | Apply knowledge of study designs and statistical methods to the appraisal of clinical studies and other information on diagnostic and therapeutic effectiveness. | Research project<br>Journal Club<br>Lectures<br>Conferences           | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|   | Use information technology to manage information, access on-line medical information; and support their own education.   | Role Modeling<br>Clinical Teaching<br>Research<br>Journal Club        | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|   | Facilitate the learning of students and other health care professionals.   | Role Modeling<br>Clinical Teaching<br>Lectures<br>Conferences         | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|   | <b>SPECIALTY SPECIFIC OBJECTIVES</b>   |   |                                      |                         |
|   | Evaluate patient care practices, discuss how they meet standards, and develop ways to improve these practices.   | Clinical Teaching<br>Self Reflection<br>Lectures<br>Conferences       | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |

| Competency                             | Required Skill(s)  | Teaching Method(s)  | Formative Evaluation Method(s)                                | Frequency of Evaluation             |
|--|--|---|---|-------------------------------------|
|  | Participate in all mandated conferences (include a list of conferences).   | Journal Club<br>Fellows School<br>Lecture<br>Pathology Conf.          | Clinical Rating Form  | Monthly                             |
|  | Complete a QA/QI project under faculty direction.  | TX Conference<br>Medplex Vascular<br>Access                           | Clinical Rating Form  | Monthly                             |
|  | Demonstrate improvement in clinical management.  | Self Reflection<br>Clinical Teaching                                  | Clinical Rating Form<br>Written Exam<br>360 degree evaluation | Monthly<br>Biannually<br>Biannually |
|  | Implement new scientific advances and clinical approaches from a variety of sources into current patient care practices.                         | Journal Club<br>Lectures/Seminars<br>Conferences<br>Clinical Teaching | Clinical Rating Form<br>Written Exam                          | Monthly<br>Biannually               |
|  | Analyze and evaluate medical literature and examine alternate sources for relevant information that pertains to their patient's health problems. | Journal Club<br>Lectures<br>Conferences<br>Role Modeling              | Clinical Rating Form<br>Written Exam                          | Monthly<br>Biannually               |
|  | Take responsibility for lifelong learning.   | Grand Rounds<br>Journal Club<br>Lectures/Seminars<br>Board Review     | Clinical Rating Form<br>Written Exam                          | Monthly<br>Biannually               |
|  | Use information technology such as Up-To-Date, PubMed or Ovid to enhance patient care  | Research Project<br>Clinical Teaching<br>Role modeling                | Clinical Rating Form<br>Written Exam                          | Monthly<br>Biannually               |
|  | Teach fellow residents, medical students, and interns.   | Clinical Teaching<br>Role Modeling                                    | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|  | Use patient care errors and near misses to teach residents and students  | Self Reflection<br>Clinical Teaching<br>Lectures                      | Clinical Rating Form<br>Written Exam                          | Monthly<br>Biannually               |
| Interpersonal and Communication Skills | <b>GENERAL OBJECTIVES</b>  |   |   |                                     |
|  | Create and sustain a therapeutic and ethically sound relationship with patients.   | Clinical Teaching<br>Role Modeling                                    | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |

| Competency | Required Skill(s)  | Teaching Method(s)  | Formative Evaluation Method(s)                                | Frequency of Evaluation             |
|------------|--|---|---|-------------------------------------|
|            | Use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills.   | Clinical Teaching<br>Role modeling<br>Case Based Teaching                           | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|            | Work effectively with others as a member or leader of a health care team or other professional group.  | Clinical Teaching<br>Role Modeling  | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | <b>SPECIALTY SPECIFIC OBJECTIVES</b>   |   |   |                                     |
|            | Carefully listen to patients to assess the patient's health problems including verbal and non-verbal communications.   | Clinical Teaching<br>Role Modeling<br>Presentation at conferences                   | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|            | Communicate and establish a therapeutic relationship with patients.  | Clinical Teaching<br>Role Modeling  | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Using respectful and considerate attitudes, demonstrate effective communication skills with patients, families, and other health care personnel, especially communications addressing end-of-life decisions. | Clinical Teaching<br>Role Modeling<br>Present at conferences<br>Case based teaching | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|            | Present a case accurately and succinctly to attending physicians, fellow residents, and other health care professionals.   | Case based teaching<br>Clinical Teaching<br>Present at conference                   | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Provide timely, legible, thorough, succinct medical record documentation - histories and physical examinations, admission notes, progress notes, procedure notes and discharge summaries.                    | Clinical Teaching<br>Role Modeling  | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Provide education and counseling to patients, and families using non-technical and clear language.   | Clinical Teaching<br>Role Modeling  | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|            | Demonstrate skill in handling all difficult patient care situations.   | Role Modeling<br>Clinical Teaching  | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |

| Competency      | Required Skill(s)  | Teaching Method(s)  | Formative Evaluation Method(s)                | Frequency of Evaluation |
|-----------------|--|---|---|-------------------------|
|                 | Speak clearly when addressing patient issues and management plans with patients, families, and health care colleagues.   | Present at conference<br>Case based teaching<br>Clinical Teaching | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |
|                 | Spend adequate time with patients addressing their questions and concerns.   | Role Modeling<br>Clinical Teaching                                | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |
|                 | Use non-verbal and verbal communication skills to effectively deliver education and counseling to patients, families, and colleagues.  | Role Modeling<br>Clinical Teaching<br>Mentoring                   | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |
|                 | Work well within team context relating to students, residents, attending physicians, nurses, and patients.   | Clinical Teaching<br>Role Modeling<br>Mentoring                   | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |
|                 | Communicate effectively when discussing patient conditions and health care practices with fellow residents, attending physicians and other health care providers.  | Present at conference<br>Case based teaching<br>Clinical Teaching | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |
|                 | Represent the Nephrology staff in interactions with patients and their families, acting with compassion and consideration at all times.  | Role Modeling<br>Clinical Teaching                                | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |
| Professionalism | <b>GENERAL OBJECTIVES</b>  |   |   |                         |
|                 | Demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients, society that supercedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development. | Mentoring<br>Role Modeling<br>Interactive Workshops               | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |
|                 | Demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care confidentiality of patient information, informed consent, and business practices.   | Mentoring<br>Role Modeling  | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |
|                 | Demonstrate a sensitivity and responsiveness to patients' culture, age, gender, and disabilities.  | Role Modeling<br>Mentoring  | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |

| Competency | Required Skill(s)   | Teaching Method(s)                              | Formative Evaluation Method(s)                                | Frequency of Evaluation             |
|------------|---|---|---|-------------------------------------|
|            | <b>SPECIALTY SPECIFIC OBJECTIVES</b>  |   |   |                                     |
|            | Professionally interact with patients, attending physicians and allied health care personnel.   | Role Modeling<br>Mentoring                      | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Establish trust with patients and staff.  | Role Modeling<br>Mentoring<br>Clinical Teaching | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Deliver high-quality medical care in a variety of critical care settings.   | Clinical Teaching<br>Mentoring                  | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|            | Demonstrate respect, compassion, integrity, punctuality, reliability, and honesty with regards to patients and colleagues.                                | Role Modeling<br>Mentoring<br>Clinical Teaching | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Show regard for the opinions of others.   | Role Modeling<br>Clinical Teaching              | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Display initiative and leadership.  | Role Modeling<br>Clinical Teaching              | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Acknowledge errors, alert patients and appropriate health care providers, and create a plan of action to minimize the errors.                             | Clinical Teaching<br>Case Based<br>Teaching     | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Demonstrate concern for educational development of students and residents.  | Role Modeling<br>Clinical Teaching              | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Volunteer for activities for the good of the institution and community.   | Role Modeling<br>Mentoring                      | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Ask for help when needed and seek and accept feedback.  | Role Modeling<br>Mentoring                      | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. | Role Modeling<br>Mentoring<br>Clinical Teaching | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Maintain patient confidentiality.   | Role Modeling<br>Clinical Teaching              | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Demonstrate understanding of the ethical concerns about pharmaceutical and patient gifts.   | Role Modeling                                   | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Compassionately respond to issues of culture, age, gender, ethnicity, and disability in patient care.   | Role Modeling<br>Clinical Teaching              | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |

| Competency             | Required Skill(s)   | Teaching Method(s)                          | Formative Evaluation Method(s)                                | Frequency of Evaluation             |
|------------------------|---|---|---|-------------------------------------|
|                        | Interface with referring and consulting physicians and appropriate hospital staff in a professional and respectful manner, recognizing and instituting the core competencies.   | Role Modeling<br>Clinical Teaching          | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
| Systems-Based Practice | <b>GENERAL OBJECTIVES</b>   |   |   |                                     |
|                        | Understand how their patient care and other professional practices affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own practice. | Clinical Teaching                           | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|                        | Know how types of medical practice and delivery systems differ from one another, including methods of controlling health care costs and allocating resources.   | Clinical Teaching<br>Interdisciplinary Team | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|                        | Practice cost-effective health care and resource allocation that does not compromise quality of care.   | Clinical Teaching<br>Interdisciplinary Team | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|                        | Advocate for quality patient care and assist patients in dealing with system complexities.  | Clinical Teaching<br>Interdisciplinary Team | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|                        | 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.   | Clinical Teaching<br>Interdisciplinary Team | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|                        | <b>SPECIALTY SPECIFIC OBJECTIVES</b>  |   |   |                                     |
|                        | Demonstrate ability to deliver high-quality medical care in private, government, and inner city hospital settings.  | Role Modeling<br>Clinical Teaching          | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|                        | Demonstrate knowledge of types of medical practice and health delivery systems and understand how this affects patient care.  | Clinical Teaching                           | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|                        | Demonstrate knowledge of business aspects of medical practice including billing, coding, and insurance.   | Conferences                                 | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|                        | Work with ancillary team members (discharge planners, case managers, and social workers) to provide high quality cost-effective care.   | Interdisciplinary Teaching                  | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |

| Competency | Required Skill(s)  | Teaching Method(s)                              | Formative Evaluation Method(s)                                | Frequency of Evaluation             |
|------------|--|---|---|-------------------------------------|
|            | Use systematic approaches to reduce errors.  | Chart Review and feedback                       | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|            | Practice effective allocation of health care resources to avoid compromising quality of care.  | Interdisciplinary Teaching                      | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|            | Interact with patients, attending physicians and allied health care personnel as part of a health care team.   | Clinical Teaching<br>Interdisciplinary Teaching | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|            | Serve as a patient advocate in the outpatient and inpatient setting.   | Clinical Teaching                               | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Direct care in inpatient and outpatient settings as a member of a multidisciplinary team.  | Clinical Teaching                               | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |
|            | Demonstrate knowledge of how the health care system including other physicians, nurses, and health care professionals affect their patient care practices. | Clinical Teaching                               | Clinical Rating Form<br>360 degree evaluation                 | Monthly<br>Biannually               |

### Learning Venues:

- 1) Review slides of typical findings seen in urinalysis.
- 2) Attend Nephrology Journal club, every Tuesday at 12 noon
- 3) Attend renal biopsy conference
- 4) Attend Medicine morning report and Medicine Grand Rounds
- 5) Attend Nephrology didactic teaching sessions: wed 11 am at 920 Madison Avenue, Suite 200.
- 6) Attend Nephrology Case Conference on fri 11am at VAMC conference room, G411.
- 7) Attend daily Nephrology attending rounds
- 8) Attend outpatient Nephrology clinics: Ê (Mon am and Thurs am for VAMC assigned residents and fellows, and Tues pm Medplex clinic for residents and fellows assigned at The Med Nephrology Consult Service.

Read the Nephrology section in Harrison's Textbook of Internal Medicine. At the end of the month, turn in the exact number of pages you have read. All aspects of the curriculum are covered in this textbook. This should be the primary reference source. Alternatively, each resident will be given a series of review articles, which cover the major nephrology topics. If this reading source is used in place of Harrison's, the resident should report which articles were completed during the rotation.

**Additional reference material:**

Up to Date: a computerized textbook of Nephrology. This is available at both the division of nephrology office at UTCHS and at the Nephrology division, VAMC. This is useful for obtaining recent literature references concerning Nephrology topics.

Department of Nephrology website ([www.utm.edu/nephrology](http://www.utm.edu/nephrology)) available to all residents includes a variety of teaching materials and schedules. Teaching materials include study guides, daily practice questions, handouts, lectures, power point presentations, scholarly activities, and reading schedules.

Renal pathophysiology. (Burton Rose and Helmut Rennke)

**Competency Evaluation:**

- 1) A multiple-choice examination will be given at the end of the rotation. The examination will deal with all aspects of clinical nephrology (as described in the resident curriculum). Questions will be formatted similarly to the Internal Medicine board examination (single best answer multiple-choice). The results of this examination will be included as part of your monthly evaluation.
- 2) The ABIM standardized global assessment form will be filled out by your attending physician.
- 3) Attendance at nephrology didactic teaching sessions and Internal Medicine Housestaff conferences should be > 75 %. Residents will provide documentation of completing the reading assignment (Harrison's text or supplemental articles).
- 4) Medical record review: Nephrology attending will review and critique a written nephrology consult, which has been performed and entered into the patient's chart. This critique will be reflected on the global assessment form.

**Outcomes Assessment:**

The educational success of our elective in nephrology will be based on two criteria:

- (1) Nephrology subsections scores on the in-service examination of all residents who have successfully complete the elective.
- (2) Nephrology subsections scores on the ABIM certifying examination in internal medicine taken by medical graduates. Our goal is all residents scoring at the 50th percentile or higher.

**ROTATION: OUTPATIENT DIALYSIS CLINIC**

**Goals:** The trainee will be able to demonstrate competency in the management of ESRD patients on maintainance Hemodialysis and Peritoneal Dialysis. To gain clinical experience and expertise in the Longterm outpatient care of the peritoneal dialysis patient through supervised involvement in decision making and didactic exercises to gain the following objectives:

**Objectives:**

By the end of the Outpatient Dialysis Clinic rotation, all residents are expected to expand and cultivate skills and knowledge learned during previous training and to achieve the following objectives based on the six general competencies. The resident should exhibit an increasing level of responsibility and independency as he or she progresses throughout the program.

| Competency   | Required Skill(s)   | Teaching Method(s)                                 | Formative Evaluation Method(s)       | Frequency of Evaluation |
|--------------|---|--|--------------------------------------|-------------------------|
| Patient Care | <b>SPECIALTY SPECIFIC OBJECTIVES</b>  |  |                                      |                         |
|              | Determine the dose and adequacy of Dialysis for in center HemoDialysis and out patient Peritoneal Dialysis patients.  | Clinical Teaching<br>Conferences<br>Demonstrations | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|              | Demonstrate competency in the technical aspects of Dialysis, including the flow rates, the dialysate composition, the Ultrafiltration profile, and how to tailor it for individual patients.  | Clinical Teaching<br>Conferences<br>Demonstrations | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|              | Set prescriptions for individual patients to meet targets by reviewing urea kinetics on a monthly basis and using DOQI guidelines as a goal.  | Clinical Teaching<br>Conferences<br>Demonstrations | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|              | Interpret Urekinetics, Creatinine clearance and PET tests and there application to tailor the dialysis prescription for CAPD patients.  | Clinical Teaching<br>Conferences<br>Demonstrations | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|              | Manage complicating medical problems to include: understanding the targets regarding blood pressure in hemodialysis patients, timing and frequency of antihypertensive drugs, and indications and contraindications of certain anti hypertensive drugs, and appropriate surgical interventions, i.e Nephrectomy when indicated. | Clinical Teaching<br>Conferences                   | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|              | Avoid intradialytic hypotension, and tailor the Dialysis prescription to prevent this complication.   | Clinical Teaching<br>Conferences                   | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|              | Manage Diabetes in ESRD patients and appropriately use  | Clinical Teaching                                  | Clinical Rating Form                 | Monthly                 |

| Competency | Required Skill(s)  | Teaching Method(s)            | Formative Evaluation Method(s)       | Frequency of Evaluation |
|------------|--|-------------------------------|--------------------------------------|-------------------------|
|            | medicine and dose adjustments, including Intraperitoneal dosing of Insulin in Peritoneal Dialysis patients.  | Conferences                   | Written Exam                         | Biannually              |
|            | Demonstrate competence regarding different kinds of accesses and managing problems associated with ESRD patients.  | Clinical Teaching Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Select access type, and determine measures to preserve its functioning.  | Clinical Teaching Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Detect and prevent vascular access and take appropriate actions to correct them.   | Clinical Teaching Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Manage patients with Renal Osteodystrophy, including judicious use of Phosphate binders, and Vitamin D analogs, and know the indications for Bone Biopsy and Parathyroidectomy.  | Clinical Teaching Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Diagnose and treat Aluminum toxicity.  | Conferences                   | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Manage anemia in ESRD patients to include using Iron supplements and Erythropoietin, dosing these medicines, and monitoring the response to therapy.   | Clinical Teaching Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Manage Nutritional problems and lipid abnormalities in ESRD patients.  | Clinical Teaching Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Work closely with the Dietician in the clinic to understand the Nutritional requirements of these patients including the use of IDPN when indicated.   | Clinical Teaching Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Demonstrate competence in drug dosing and interactions in ESRD patients; and in adjusting the dose and frequency of pharmacological agents in these patients as well as using supplements for products lost with dialysis (i.e. Certain Vitamins). | Clinical Teaching Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Screen patients for renal transplants.   | Clinical Teaching Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Participate in discussions regarding referral to transplant center.  | Clinical Teaching Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Demonstrate competence in regards to switching patient from one form of therapy to another based on the clinical   | Clinical Teaching Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |

| Competency        | Required Skill(s)  | Teaching Method(s)                   | Formative Evaluation Method(s)       | Frequency of Evaluation |
|-------------------|--|--------------------------------------|--------------------------------------|-------------------------|
|                   | situation (i.e. from Hemodialysis to CAPD, or vice versa).   |                                      |                                      |                         |
|                   | Manage Peritonitis and other catheter related infections.  | Clinical Teaching Conferences        | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                   | Consider medical, social, and psychological issues, which are used in assist patients in choosing the most appropriate modality of dialysis.   | Clinical Teaching Conferences        | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                   | Manage common medical problems as outpatient and appropriate referral to specialists and hospitalization when necessary.   | Clinical Teaching Conferences        | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                   | Evaluate and select patients for peritoneal dialysis modalities, including assessment of peritoneal physiology, social and psychological parameters, and matching the mode of dialysis to lifestyle needs.                         | Clinical Teaching Conferences        | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                   | Choose the appropriate type of peritoneal dialysis catheter, matching catheter type to patient anatomy, and methods of catheter placement including open surgical, laporoscopic, and closed trochar placement.                     | Conference                           | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                   | Determine and interpret dialysis adequacy measures including area kinetic modeling, creatinine clearance, and peritoneal equilibration testing and their roles in the formulation of an adequate peritoneal dialysis prescription. | Clinical Teaching Conferences        | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                   | Manage ESRD complications including anemia, bone disease, and nutritional needs, as related to the peritoneal dialysis population.   | Clinical Teaching Conferences        | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                   | Diagnose and manage catheter related complications including exit site and tunnel infections, catheter malposition, and omental obstruction.   | Clinical Teaching Conferences        | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                   | Diagnose and manage peritonitis, including simple CAPD peritonitis and that caused by intraabdominal catastrophes.   | Clinical Teaching Conferences        | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
| Medical Knowledge | <b>SPECIALTY SPECIFIC OBJECTIVES</b>   |                                      |                                      |                         |
|                   | Broaden experience with the equipment and procedures needed to perform peritoneal dialysis including both CAPD and cyclers.  | Demonstrations<br>Conferences<br>PDU | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                   | Demonstrate competency regarding pharmacology of   | Clinical Teaching                    | Clinical Rating Form                 | Monthly                 |

| Competency | Required Skill(s)   | Teaching Method(s)     | Formative Evaluation Method(s) | Frequency of Evaluation |
|------------|---|------------------------|--------------------------------|-------------------------|
|            | commonly used medications and their kinetic and dosage modification with peritoneal dialysis. | Self-Directed Learning | Written Exam                   | Biannually              |

**Learning Venues/Case Mix/Teaching methods**

1. University Hemodialysis unit which has Hemodialysis and Peritoneal Dialysis patients.
2. Rounds with attending Nephrologist, evaluation and adjustment of dialysis prescriptions as well as medications as appropriate.
3. CAPD clinic twice weekly.
4. Attendance at weekly Journal club and twice weekly didactic sessions.

**Competency evaluation:**

1. Based on end of the rotation global assessment.
2. Written examination administered every six months.
3. Written documentation of completion of the self study manual/notebook which has been developed for use during the chronic rotation.

**Rotation:**  
**Nephrology Outpatient Clinics (Medplex Regional Medical Center and VAMC)**

**Goals:**  
 Every resident will be able to demonstrate competency in the evaluation, diagnosis, and treatment of common nephrology conditions seen in the outpatient setting.

**Objectives:**  
 By the end of the Nephrology Outpatient Clinic, all residents are expected to expand and cultivate skills and knowledge learned during previous training and to achieve the following objectives based on the six general competencies. The resident should exhibit an increasing level of responsibility and independency as he or she progresses throughout the program.

| Competency                         | Required Skill(s)   | Teaching Method(s)   | Formative Evaluation Method(s)       | Frequency of Evaluation |
|------------------------------------|---|--|--------------------------------------|-------------------------|
| Patient Care and Medical Knowledge | <b>SPECIALTY SPECIFIC OBJECTIVES</b>  |  |                                      |                         |
|                                    | Chronic Renal Insufficiency: <ul style="list-style-type: none"> <li>• Diagnose chronic renal disease and its complications.</li> <li>• Implement treatment plans to slow progression of disease.</li> <li>• Manage volume and electrolyte abnormalities associated with chronic renal disease.</li> <li>• Evaluate and treat anemia and renal osteodystrophy.</li> <li>• Manage diabetic nephropathy and hypertensive nephrosclerosis.</li> </ul> | Clinical Teaching<br>Conferences<br>Self-Directed Learning | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                                    | Proteinuria: <ul style="list-style-type: none"> <li>• Evaluate proteinuria.</li> <li>• Differentiate between glomerular, tubular, and interstitial diseases.</li> <li>• Manage renal diseases associated with proteinuria.</li> </ul>   | Conferences<br>Clinical Teaching                           | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                                    | Hypertension: <ul style="list-style-type: none"> <li>• Diagnose, evaluate, and treat systemic hypertension.</li> <li>• Distinguish between primary and secondary hypertension and in the appropriate use of</li> </ul>  | Conferences<br>Clinical Teaching                           | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |

| Competency | Required Skill(s)  | Teaching Method(s)               | Formative Evaluation Method(s)                | Frequency of Evaluation |
|------------|--|----------------------------------|---|-------------------------|
|            | pharmacotherapy in the treatment of hypertension.  |                                  |   |                         |
|            | Electrolytes: <ul style="list-style-type: none"> <li>Demonstrate competency in the evaluation and treatment of disturbances of sodium balance, potassium balance, body water alterations, and calcium and magnesium balances.</li> </ul>   | Conferences<br>Clinical Teaching | Clinical Rating Form<br>Written Exam          | Monthly<br>Biannually   |
|            | Nephrolithiasis: <ul style="list-style-type: none"> <li>Demonstrate competency in the evaluation of recurrent nephrolithiasis and in identification and treatment of metabolic etiologies of nephrolithiasis.</li> </ul>   | Conferences<br>Clinical Teaching | Clinical Rating Form<br>Written Exam          | Monthly<br>Biannually   |
|            | Transplantation: <ul style="list-style-type: none"> <li>Provide practical experience in the longitudinal follow-up of both cadaveric and living related donor kidney transplant recipients. These patients are followed by the trainees during their longitudinal clinic at the VAMC.</li> <li>Demonstrate competency in the long-term management of immunosuppressive therapy, assessment of kidney transplant function, assessment and treatment of metabolic complications related to immunosuppressive therapy, diagnosis and prevention of infectious complications, and management of common medical problems in this patient population.</li> </ul> | Conferences<br>Clinical Teaching | Clinical Rating Form<br>Written Exam          | Monthly<br>Biannually   |
|            | Educate and counsel patients and families on a variety of nephrology disorders, including but not limited to: <ul style="list-style-type: none"> <li>Chronic renal insufficiency</li> <li>Proteinuria</li> <li>Hypertension</li> <li>Electrolytes</li> <li>Nephrolithiasis</li> <li>Transplantation</li> </ul>   | Conferences<br>Clinical Teaching | Clinical Rating Form<br>360 degree evaluation | Monthly<br>Biannually   |

**Learning Venues:**

Most information will be covered through evaluation of clinic patients and review of patient records. Handout summarizing DOQI recommendations for management of CRI will be reviewed and used in the assessment of clinic patients. Questions will be provided for discussion of problems not regularly seen during clinic sessions.

**Additional Reference Material:**

Internet access is available in the clinic conference room for literature searches. General Internal Medicine textbooks are available in the clinic. Fluid and Electrolyte reference and Primer of Renal Disease is available for review. Up-to-Date computerized medical textbook is integrated into the computerized medical record at the VAMC.

**Rotation: Nephrology  
Methodist University Hospital**

**Goals:**

Every resident will be able to demonstrate competency in the evaluation, diagnosis, and treatment of clinical nephrologic conditions. Unique clinical experiences at Methodist University Hospital (MUH) include renal complications of severe liver disease, liver transplantation, and bone marrow transplantation.

**Objectives:**

By the end of the Nephrology rotation at MUH, all residents are expected to expand and cultivate skills and knowledge learned during previous training and to achieve the following objectives based on the six general competencies. The resident should exhibit an increasing level of responsibility and independency as he or she progresses throughout the program.

| Competency   | Required Skill(s)   | Teaching Method(s)   | Formative Evaluation Method(s)                                | Frequency of Evaluation             |
|--|---|--|---|-------------------------------------|
| Patient Care and Medical Knowledge   | <b>SPECIALTY SPECIFIC OBJECTIVES</b>  |  |   |                                     |
|  | Fluid and electrolytes: <ul style="list-style-type: none"> <li>Demonstrate competence in the evaluation and treatment of disorders of sodium balance, potassium balance, body water alterations, and disorders of calcium, phosphorus, and magnesium balances.</li> </ul>   | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|  | Acid/Base disorders: <ul style="list-style-type: none"> <li>Demonstrate competence in the evaluation and treatment of simple and mixed acidosis and alkalosis, categorizing acidbase disorders as metabolic or respiratory, and determining if acidbase disorders are appropriately compensated.</li> </ul>   | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
|  | Acute Renal Failure: <ul style="list-style-type: none"> <li>Demonstrate competence in diagnosing, evaluating and treating acute renal failure; in conservative treatment as well as in the appropriate use of dialysis for acute renal failure; in differentiating between acute glomerular, tubular and interstitial diseases; and in differentiating between primary and secondary acute renal diseases.</li> </ul> | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
| Chronic renal disease: <ul style="list-style-type: none"> <li>Demonstrate competence in the diagnosis, evaluation of patients with chronic renal disease;</li> </ul> | Clinical Teaching<br>Conferences<br>Journal Club  | Clinical Rating Form<br>360 degree evaluation<br>Written Exam              | Monthly<br>Biannually<br>Biannually                           |                                     |

| Competency | Required Skill(s)   | Teaching Method(s)   | Formative Evaluation Method(s)   | Frequency of Evaluation                      |
|------------|---|--|--|--|
|            | <p>in the management of chronic coexistent conditions complicating the course of chronic renal disease; in differentiating between chronic glomerular, tubular and interstitial diseases; in differentiating between primary and secondary chronic renal disease; and in the appropriate preparation of these patients for renal replacement therapy.</p>   | <p>Self Directed Learning</p>  |  |  |
|            | <p>Investigations:</p> <ul style="list-style-type: none"> <li>Demonstrate competence in treating patients with renal disease, in the appropriate selection of diagnostic imaging studies, in the appropriate selection and interpretation of blood and urine biochemistry, in the use and interpretation of microscopic urinalysis, in the use of medical microbiology in the evaluation and treatment, and in the use of anatomical histopathology in evaluation and treatment.</li> </ul> | <p>Clinical Teaching<br/>Conferences<br/>Journal Club<br/>Self Directed Learning</p> | <p>Clinical Rating Form<br/>360 degree evaluation<br/>Written Exam</p> | <p>Monthly<br/>Biannually<br/>Biannually</p> |
|            | <p>Hypertension:</p> <ul style="list-style-type: none"> <li>Demonstrate competence in the diagnosis, evaluation and treatment of patients with systemic hypertension, in distinguishing between primary and secondary hypertension, and in the appropriate use of pharmacotherapy in the treatment of hypertension.</li> </ul>  | <p>Clinical Teaching<br/>Conferences<br/>Journal Club<br/>Self Directed Learning</p> | <p>Clinical Rating Form<br/>360 degree evaluation<br/>Written Exam</p> | <p>Monthly<br/>Biannually<br/>Biannually</p> |
|            | <p>Diabetes Mellitus:</p> <ul style="list-style-type: none"> <li>Demonstrate competence in the diagnosis, evaluation and treatment of patients with diabetes mellitus, with and without renal disease, in managing the systemic complications of diabetes mellitus, in distinguishing between Type I and Type II diabetes and will demonstrate competence in the management of each, and in the diagnosis, evaluation and treatment of patients with metabolic syndrome.</li> </ul>         | <p>Clinical Teaching<br/>Conferences<br/>Journal Club<br/>Self Directed Learning</p> | <p>Clinical Rating Form<br/>360 degree evaluation<br/>Written Exam</p> | <p>Monthly<br/>Biannually<br/>Biannually</p> |

| Competency | Required Skill(s)  | Teaching Method(s)   | Formative Evaluation Method(s)   | Frequency of Evaluation                      |
|------------|--|--|--|--|
|            | <p>End Stage Renal disease:</p> <ul style="list-style-type: none"> <li>Demonstrate competence in the treatment of ESRD patients, in the understanding and appropriate treatment of their potential complications, in the appropriate indications for acute hemodialysis in these patients, and how to write dialysis orders.</li> </ul>  | <p>Clinical Teaching Conferences<br/>Journal Club<br/>Self Directed Learning</p> | <p>Clinical Rating Form<br/>360 degree evaluation<br/>Written Exam</p> | <p>Monthly<br/>Biannually<br/>Biannually</p> |
|            | <p>Renal Replacement therapy:</p> <ul style="list-style-type: none"> <li>Demonstrate an understanding of the various forms of Renal replacement therapy, and their applications, namely Conventional Hemodialysis, SLED, CRRT, CAPD etc. The trainee will be expected to have a sound understanding of the pros and cons of every dialysis modality, and the technical aspects of the modality including procedures such as Dialysis catheter insertion. They will be expected to show competence as to the indication, prescription, potential complications, and duration of therapy. They will also be expected to show competency for drug dosing in relation to the on going therapy, dose adjustments in relation to the decreased renal function and the clearance due to the therapy.</li> </ul> | <p>Clinical Teaching Conferences<br/>Journal Club<br/>Self Directed Learning</p> | <p>Clinical Rating Form<br/>360 degree evaluation<br/>Written Exam</p> | <p>Monthly<br/>Biannually<br/>Biannually</p> |

**Patient characteristics and Case mix:** The nephrology service provides consultation for this large tertiary community Hospital which has become the official Methodist University Hospital. Nephrology division patients (particularly the endstage renal disease patients) are admitted primarily to the Internal Medicine service.

**Learning Venues/Teaching methods:**

1. Attend the daily Nephrology attending rounds where all patients followed are reviewed at bedside on a daily basis.
2. Attend longitudinal Nephrology clinics ( ½ day per week)
3. Participate in evaluation of acute problems in the acute hemodialysis unit
4. Discuss all radiological studies (Ultrasound/scan etc) with the Nephrology attending and the radiologist.
5. Discuss and personally look at kidney biopsies
6. Perform procedures under the guidance of the Attending nephrologist.

7. Attend weekly journal club and didactic teaching session every Wednesday and Friday at 11AM., Tuesday at 12pm.

**Reference material:**

1. Textbook: Comprehensive Clinical Nephrology, 3rd edition. All fellows are provided a copy of this textbook.
2. Up-to-date computerized textbook of Nephrology available on VAMC computerized medical record.
3. Nephrology web site: [www.utm.edu/nephrology](http://www.utm.edu/nephrology) contains a number of summaries of major nephrology issues, as well as practice problems.
4. Additional Textbooks: Handbook of Dialysis and Handbook of Transplantation.

**Competency Evaluation:**

- 1) A multiple choice examination will be given at the end of the rotation. The examination will deal with all aspects of clinical nephrology (as described in the resident curriculum). Questions will be formatted similarly to the Internal Medicine board examination (single best answer multiple choice). The results of this examination will be included as part of your monthly evaluation.
- 2) The ABIM standardized global assessment form will be filled out by your attending physician.
- 3) Attendance at nephrology didactic teaching sessions and Internal Medicine House staff conferences should be greater than 75%. Residents will provide documentation of completing the reading assignment (Harrison's text or supplemental articles).
- 4) Medical record review: Nephrology attending will review and critique a written nephrology consult, which had been performed and entered into the patient's chart. This critique will be reflected on the global assessment form.

**Outcomes Assessment:**

The educational success of our fellowship in nephrology will be based in the following.

- 1) Successful completion of the 2 years fellowship.
- 2) Successful completion of all the rotation.
- 3) Active participation in research with completion of at least one project ideally a presentation at one of the nephrology national meetings and
- 4) Successfully passing the Nephrology Boards

**ROTATION: RENAL CONSULT ROTATION  
REGIONAL MEDICAL CENTER.**

**Goals:** To be able to demonstrate competency in the evaluation, diagnosis, and treatment of renal problems encountered in the hospital setting. Unique experiences during the Renal Consult Rotation at the Regional Medical Center (MED) include renal complications of pregnancy, trauma and burn patients, and acute glomerular disease such as systemic lupus erythenatosis.

**Objectives:**

By the end of the Renal Consult rotation at the MED, all residents are expected to expand and cultivate skills and knowledge learned during previous training and to achieve the following objectives based on the six general competencies. The resident should exhibit an increasing level of responsibility and independency as he or she progresses throughout the program.

| Competency                         | Required Skill(s)   | Teaching Method(s)   | Formative Evaluation Method(s)       | Frequency of Evaluation |
|------------------------------------|---|--|--------------------------------------|-------------------------|
| Patient Care and Medical Knowledge | <b>SPECIALTY SPECIFIC OBJECTIVES</b>  |  |                                      |                         |
|                                    | Demonstrate competency in the evaluation of unexpected or increasing serum creatinine concentrations, including distinguishing between prerenal, intrinsic renal, and post renal etiologies.  | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                                    | Fluid/Electrolyte management: <ul style="list-style-type: none"> <li>Demonstrate competency in the evaluation and treatment of disorders of sodium, potassium, calcium, magnesium balance, and alteration in body water balance.</li> </ul>   | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                                    | AcidBase disorders: <ul style="list-style-type: none"> <li>Demonstrate competency in evaluation and treatment of simple and mixed Acidosis and Alkalosis.</li> </ul>  | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                                    | Acute renal disorders: <ul style="list-style-type: none"> <li>Demonstrate competency in diagnosing, evaluating and treating patients with acute renal failure, and order appropriate diagnosing testing, which will include performing Kidney biopsies when indicated. The trainee will make decisions regarding the initiation and dosage of dialysis and</li> </ul> | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |

| Competency | Required Skill(s)  | Teaching Method(s)   | Formative Evaluation Method(s)       | Frequency of Evaluation |
|------------|--|--|--------------------------------------|-------------------------|
|            | insertion of temporary dialysis catheters when necessary. He/She will be able to demonstrate ability for dose adjustments and appropriate usage of various pharmacological agents.   |  |                                      |                         |
|            | Investigations: <ul style="list-style-type: none"> <li>Develop competency in ordering relevant investigations, which will include serological studies,( e.g.: immunological studies,); Urine examination (microscopic), radiological studies (renal scan, ultrasound, renal Angiogram etc), and indications, interpretation and competence of performing kidney biopsies.</li> </ul>   | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | Hemodialysis: <ul style="list-style-type: none"> <li>Evaluate and manage patients needing hemodialysis</li> <li>Demonstrate an understanding of the pros and cons of hemodialysis, and the technical aspects of the modality including procedures such as Dialysis catheter insertion. They will be expected to show competence as to the indication, prescription, potential complications, and duration of therapy. They will also be expected to show competency for drug dosing in relation to the on going therapy, dose adjustments in relation to the decreased renal function and the clearance due to the therapy.</li> </ul> | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |

**Patient Characteristics and Case Mix:**

Nephrology service provides consultation to all aspects of the Regional Medical Center. The Regional Medical Center is a full service medical surgical hospital affiliated with the University of Tennessee. The Regional Medical Center also includes the area's only level 1 regional trauma center, as well and is the regional burn center, and a high risk obstetrics service.

**Learning Venues/Teaching Methods**

1. Attend the daily Nephrology attending rounds where all patients followed are reviewed at bedside on a daily basis.
2. Attend Nephrology clinics on Mon and Thurs, each clinic is ½ day.

3. Participate in evaluation of acute problems in the acute hemodialysis unit.
4. Discuss all radiological studies (Ultrasound/scan etc) with the Nephrology attending and the radiologist.
5. Discuss and personally look at kidney biopsies with Dr. Walker (renal pathologist).
6. Perform procedures under the guidance of the Attending nephrologist.
7. Attend weekly journal club and didactic teaching session every Wednesday and Friday at 11am and Tuesday at 12pm.

**Reference Material:**

1. Textbook: Comprehensive Clinical Nephrology, 3<sup>rd</sup> edition. All fellows are provided a copy of this textbook.
2. Up-to-date computerized textbook of Nephrology available on VAMC computerized medical record.
3. Nephrology web site: [www.utmem.edu/nephrology](http://www.utmem.edu/nephrology) contains a number of summaries of major nephrology issues, as well as practice problems.
4. Additional Textbooks: Handbook of Dialysis and Handbook of Transplantation.

**Competency Evaluation:**

1. Evaluation of clinical competency by attending physician based on case presentation, day to day management and notes documented in the chart.
2. Rotation end examination. Additional multiple choice nephrology examination is given every six months.
3. Written documentation of completion of self study requirements provided on the Nephrology website.

**ROTATION:****VAMC CONSULT ROTATION:**

**Goals:** To be able to demonstrate competency in the evaluation, diagnosis, and treatment of renal problems encountered in both outpatient and hospital settings.

**Objectives:**

By the end of the VAMC Consult rotation, all residents are expected to expand and cultivate skills and knowledge learned during previous training and to achieve the following objectives based on the six general competencies. The resident should exhibit an increasing level of responsibility and independency as he or she progresses throughout the program.

| Competency                         | Required Skill(s)  | Teaching Method(s)   | Formative Evaluation Method(s)       | Frequency of Evaluation |
|------------------------------------|--|--|--------------------------------------|-------------------------|
| Patient Care and Medical Knowledge | <b>SPECIALTY SPECIFIC OBJECTIVES</b>   |  |                                      |                         |
|                                    | Demonstrate competency in laboratory and clinical parameters used in the diagnosis and staging of chronic kidney disease.  | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                                    | Acid Base disorders: <ul style="list-style-type: none"> <li>Demonstrate competency in evaluation and treatment of simple and mixed Acidosis and Alkalosis.</li> </ul>  | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                                    | Acute renal disorders: <ul style="list-style-type: none"> <li>Demonstrate competency in diagnosing, evaluating and treating patients with acute renal failure, and order appropriate diagnostic testing, which will include performing Kidney biopsies when indicated. The trainee will make decisions regarding the initiation and dosage of dialysis and insertion of temporary dialysis catheters when necessary. He/She will be able to demonstrate ability for dose adjustments and appropriate usage of various pharmacological agents.</li> </ul> | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed Learning | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|                                    | Investigations: <ul style="list-style-type: none"> <li>Demonstrate competency in ordering relevant investigations, which will include serological studies,( e.g.: immunological studies,); Urine</li> </ul>  | Clinical Teaching<br>Conferences<br>Journal Club<br>Self Directed          | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |

| Competency | Required Skill(s)   | Teaching Method(s)   | Formative Evaluation Method(s)               | Frequency of Evaluation       |
|------------|---|--|--|-------------------------------|
|            | examination (microscopic), radiological studies (renal scan, ultrasound, renal Angiogram etc), and indications, interpretation and competence of performing kidney Biopsies.  | Learning   |  |                               |
|            | <p>CAPD, CCPD, and Hemodialysis:</p> <ul style="list-style-type: none"> <li>Evaluate and manage patients needing CAPD, CCPD, and hemodialysis</li> <li>Demonstrate an understanding of the pros and cons of CAPD, CCPD, and hemodialysis, and the technical aspects of the modality including procedures such as Dialysis catheter insertion. They will be expected to show competence as to the indication, prescription, potential complications, and duration of therapy. They will also be expected to show competency for drug dosing in relation to the on going therapy, dose adjustments in relation to the decreased renal function and the clearance due to the therapy.</li> </ul> | <p>Clinical Teaching Conferences<br/>Journal Club<br/>Self Directed Learning</p> | <p>Clinical Rating Form<br/>Written Exam</p> | <p>Monthly<br/>Biannually</p> |
|            | <p>Fluid/Electrolyte management:</p> <ul style="list-style-type: none"> <li>Demonstrate competency in the evaluation and treatment of disorders of Sodium, Potassium, Calcium, Magnesium balance, and Alteration in Body water balance</li> </ul>   | <p>Clinical Teaching Conferences<br/>Journal Club<br/>Self Directed Learning</p> | <p>Clinical Rating Form<br/>Written Exam</p> | <p>Monthly<br/>Biannually</p> |
|            | Demonstrate competency in distinguishing between essential hypertension and secondary causes of hypertension. The trainee must demonstrate competency in ordering the appropriate laboratory workup for the major forms of secondary hypertension.  | <p>Clinical Teaching Conferences<br/>Journal Club<br/>Self Directed Learning</p> | <p>Clinical Rating Form<br/>Written Exam</p> | <p>Monthly<br/>Biannually</p> |

**Learning Venues/Teaching Methods/Case Mix:**

1. Attend the daily Nephrology attending rounds where all patients followed are reviewed at bedside on a daily basis
2. Attend Nephrology clinics on Mon and Thurs, each clinic is ½ day.
3. Participate in rounds and in evaluation of acute problems in the VAMC chronic dialysis unit. There are approximately 35 in center hemodialysis patients and 8 chronic peritoneal dialysis patients.
4. Discuss all radiological studies (Ultrasound/scan etc) with the Nephrology attending and the radiologist.

5. Discuss and personally look at kidney biopsies
6. Perform procedures under the guidance of the Attending nephrologist.
7. Attend weekly journal club and didactic teaching session every Wednesday and Friday at 11am and Tuesday at 12pm.

**Reference Material:**

1. Textbook: Comprehensive Clinical Nephrology, 3<sup>rd</sup> edition. All fellows are provided a copy of this textbook.
2. Up-to-date computerized textbook of Nephrology available on VAMC computerized medical record.
3. Nephrology web site: [www.utmem.edu/nephrology](http://www.utmem.edu/nephrology) contains a number of summaries of major nephrology issues, as well as practice problems.
4. Additional Textbooks: Handbook of Dialysis and Handbook of Transplantation.

**Competency Evaluation:**

1. Evaluation of clinical competency by attending physician based on case presentation, day to day management and notes documented in the chart.
2. Rotation end examination. Additional multiple choice nephrology examination is given every six months.
3. Written documentation of completion of self study requirements provided on the Nephrology website.

**UNIVERSITY OF TENNESSEE  
COLLEGE OF MEDICINE  
MEMPHIS**

## TRANSPLANT ROTATION DESCRIPTION AND CURRICULUM

### I. Introduction

The transplant rotation at University of Tennessee, Memphis is a three month experience for renal fellows in their second year of training. The rotation is designed to provide the renal fellows with a comprehensive experience in the care of renal and pancreas transplant recipients. The renal fellows are involved in the management of patients from pre-transplant evaluation to periand post-transplant periods. The renal fellows also participate in the medical management of renal dysfunction and immunosuppression related complications in liver transplant recipients. During the course of training, the renal fellows are encouraged to participate in didactic meetings and discuss transplant related topics.

### II. Goals and Objectives

By the end of the Transplant rotation, all residents are expected to expand and cultivate skills and knowledge learned during previous training and to achieve the following objectives based on the six general competencies. The resident should exhibit an increasing level of responsibility and independency as he or she progresses throughout the program.

| Competency        | Required Skill(s)  | Teaching Method(s)   | Formative Evaluation Method(s)                                | Frequency of Evaluation             |
|-------------------|--|--|---|-------------------------------------|
| Patient Care      | <b>SPECIALTY SPECIFIC OBJECTIVES</b>   |  |   |                                     |
|                   | Discuss and evaluate ESRD patients and select appropriate candidates for referral to transplant centers.   | Conferences<br>Clinical Teaching<br>Self Directed Learning | Clinical Rating Form<br>Written Exam                          | Monthly<br>Biannually               |
|                   | Perform pre and post operative evaluation and preparation of transplant recipients and potential living donors.  | Conferences<br>Clinical Teaching<br>Self Directed Learning | Clinical Rating Form<br>Written Exam                          | Monthly<br>Biannually               |
|                   | Formulate a clinical diagnosis of all forms of allograft rejection including laboratory, histopathologic and imaging techniques.   | Biopsy Conference<br>HLA Lab<br>Clinical Teaching          | Clinical Rating Form<br>Written Exam                          | Monthly<br>Biannually               |
|                   | Manage rejection including use of immunosuppressant drugs and other agents.  | Clinical Teaching  | Clinical Rating Form<br>Written Exam                          | Monthly<br>Biannually               |
|                   | Participate in longterm follow up of transplant recipients in the ambulatory care setting with emphasis on managing immunosuppressive medications and comorbid conditions. | Clinical Teaching  | Clinical Rating Form<br>360 degree evaluation<br>Written Exam | Monthly<br>Biannually<br>Biannually |
| Medical Knowledge | <b>SPECIALTY SPECIFIC OBJECTIVES</b>   |  |   |                                     |
|                   | Demonstrate an understanding of transplantation immunobiology; with special emphasis on HLA antigens, tissue typing, and allograft rejection.                              | Clinical Teaching<br>Conferences                           | Clinical Rating Form<br>Written Exam                          | Monthly<br>Biannually               |
|                   | Demonstrate an understanding of the basics of immediate  | Clinical Teaching  | Clinical Rating Form  | Monthly                             |

| Competency | Required Skill(s)   | Teaching Method(s)   | Formative Evaluation Method(s)       | Frequency of Evaluation |
|------------|---|--|--------------------------------------|-------------------------|
|            | postoperative management of transplant recipients, including administration of immunosuppressants, recognition of medical and surgical complications.   | Self Directed Learning                                     | Written Exam                         | Biannually              |
|            | Demonstrate knowledge of infections and other complications of renal transplantation and prompt diagnosis and referral of patients to transplant centers.   | Conferences<br>Clinical Teaching                           | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | <b>Pretransplant Evaluation of End Stage Renal Disease Patients.</b><br>1. History and physical examination<br>2. Laboratory investigation<br>3. Cardiopulmonary evaluation<br>(a) EKG<br>(b) Echo<br>(c) Cardiac stress testing<br>(d) Chest Xray<br>(e) PFT's (Pulmonary Function Tests)  | Clinical Teaching<br>Conferences                           | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | <b>Transplantation Immunobiology</b><br>1. Components of immune system<br>2. Major histocompatibility antigens, histocompatibility testing and crossmatching<br>3. The "sensitized" patient (preformed reactive antibodies)<br>4. Allograft rejection<br>(a) Hyperacute rejection<br>(b) Accelerated acute rejection<br>(c) Acute rejection<br>(d) Chronic rejection<br>5. Mechanism of rejection and cytokines involved<br>6. Posttransplant immunologic monitoring with serum, urinary and histologic markers | Conferences<br>Clinical Teaching<br>Self Directed Learning | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | <b>Immunosuppressive Medications and Protocols for Kidney Transplantation</b><br>1. Calcineurin inhibitors; mechanism of action, side   | Conferences<br>Clinical Teaching<br>Self Directed          | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |

| Competency | Required Skill(s)  | Teaching Method(s)                            | Formative Evaluation Method(s)       | Frequency of Evaluation |
|------------|--|---|--------------------------------------|-------------------------|
|            | effects, drug interactions<br>2. Corticosteroids; mechanisms of action, side effects, drug interactions<br>3. Azathioprine; mechanisms of action, sideeffects, drug interactions<br>4. Mycophenolate Mofetil; mechanisms of action, sideeffects, drug interactions<br>5. TOR inhibitors; (Sirolimus) mechanism of action, side effects, drug interactions.<br>6. Monoclonal and polyclonal antibodies<br>(a) OKT3<br>(b) Thymoglobulin<br>(c) Anti CD25 (humanized antibodies) | Reading                                       |                                      |                         |
|            | <b>Immunosuppressive Protocols</b><br>1. Protocols for cadaveric transplant<br>2. Protocols for living related and unrelated transplant<br>3. Protocols for high risk patients<br>4. Antirejection protocols   | Clinical Teaching<br>Self Directed<br>Reading | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | <b>Transplant Operation and Surgical Complications</b><br>1. Organ procurement<br>2. Transplant surgery<br>3. Wound infection<br>4. Lymphocele<br>5. Bleeding<br>6. Graft thrombosis<br>7. Renal artery stenosis<br>8. Urinary leak<br>9. Ureteral obstruction   | Clinical Teaching<br>Self Directed<br>Reading | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |

| Competency | Required Skill(s)  | Teaching Method(s)   | Formative Evaluation Method(s)       | Frequency of Evaluation |
|------------|--|--|--------------------------------------|-------------------------|
|            | <b>Renal Graft Dysfunction</b><br>1. Delayed graft function<br>2. Rejection (acute and chronic)<br>3. Chronic allograft dysfunction (nephrotoxicity, denovo or recurrent GN)   | Clinical Teaching<br>Self Directed<br>Reading                | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | <b>Renal Allograft Rejection</b><br>1. Types:<br>(a) Hyperacute<br>(b) Accelerated acute<br>(c) Acute<br>(d) Chronic<br>2. Causes<br>3. Immunopathology<br>4. Treatment  | Clinical Teaching<br>Self Directed<br>Reading<br>Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |
|            | <b>Posttransplant Management and Complications</b><br>1. Immunosuppression management<br>2. Hypertension and cardiovascular disease<br>3. Posttransplant diabetes mellitus<br>4. Posttransplant lymphoproliferative disorders<br>5. Infections (see part I)<br>6. Hyperlipidemia and atherosclerosis<br>7. Bone and mineral metabolism<br>8. Pregnancy<br>9. Posttransplant malignancies<br>10. Posttransplant skin diseases | Clinical Teaching<br>Self Directed<br>Reading<br>Conferences | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |

| Competency | Required Skill(s)   | Teaching Method(s)   | Formative Evaluation Method(s)               | Frequency of Evaluation       |
|------------|---|--|--|-------------------------------|
|            | <p><b>Infectious Complications of Kidney Transplantation</b></p> <ol style="list-style-type: none"> <li>1. Pretransplant screening and immunization</li> <li>2. Approach to fever in kidney allograft recipients</li> <li>3. CMV infection – manifestations, diagnosis, treatment</li> <li>4. UTI</li> <li>5. Skin and wound infections</li> <li>6. Pneumonia               <ol style="list-style-type: none"> <li>(a) Viral</li> <li>(b) Bacterial</li> <li>(c) Fungal and parasite</li> </ol> </li> <li>7. CNS infections               <ol style="list-style-type: none"> <li>(a) Meningitis</li> <li>(b) Encephalitis</li> </ol> </li> <li>8. Parvovirus infection</li> <li>9. Polyoma virus infection</li> </ol> | <p>Clinical Teaching<br/>Self Directed<br/>Reading<br/>Conferences</p> | <p>Clinical Rating Form<br/>Written Exam</p> | <p>Monthly<br/>Biannually</p> |
|            | <p><b>Radiology of Kidney Transplantation</b></p> <ol style="list-style-type: none"> <li>1. Radiologic evaluation of living donor</li> <li>2. Radiologic techniques in early posttransplant period               <ol style="list-style-type: none"> <li>(a) Renal scan</li> <li>(b) Ultrasonography with dopplers</li> <li>(c) CT Scan</li> </ol> </li> <li>3. Radiologic techniques in the late posttransplant period</li> </ol>   | <p>Clinical Teaching</p>   | <p>Clinical Rating Form<br/>Written Exam</p> | <p>Monthly<br/>Biannually</p> |

| Competency | Required Skill(s)  | Teaching Method(s)                      | Formative Evaluation Method(s)               | Frequency of Evaluation       |
|------------|--|---|--|-------------------------------|
|            | <p><b>Pathology of Kidney Transplantation</b></p> <ol style="list-style-type: none"> <li>1. Renal allograft biopsy: indications, technique, complications</li> <li>2. Transplant rejection types               <ol style="list-style-type: none"> <li>(a) Cell mediated acute rejection</li> <li>(b) Antibody mediated acute rejection</li> <li>(c) Chronic rejection</li> </ol> </li> <li>3. Cyclosporin/FK Toxicity</li> <li>4. Acute tubular necrosis</li> <li>5. Infections</li> <li>6. Recurrent lesions</li> </ol>       | <p>Pathology Conference<br/>Reading</p> | <p>Clinical Rating Form<br/>Written Exam</p> | <p>Monthly<br/>Biannually</p> |
|            | <p><b>Psychiatric Aspects of Kidney Transplantation</b></p> <ol style="list-style-type: none"> <li>1. Pretransplant psychiatric assessment</li> <li>2. Early posttransplant psychiatric issues               <ol style="list-style-type: none"> <li>(a) Anxiety</li> <li>(b) Depression</li> <li>(c) Delirium</li> </ol> </li> <li>3. Psychiatric Interventions               <ol style="list-style-type: none"> <li>(a) Psychotherapeutic interventions</li> <li>(b) Psychopharmacologic interventions</li> </ol> </li> </ol> | <p>Clinical Teaching Conferences</p>    | <p>Clinical Rating Form<br/>Written Exam</p> | <p>Monthly<br/>Biannually</p> |
|            | <p><b>Ethical and Legal Issues in Kidney Transplant</b></p> <ol style="list-style-type: none"> <li>1. Donation and procurement of organs according to UNOS regulations</li> <li>2. Selection of patients for transplantation</li> <li>3. Resource allocation issues</li> </ol>   | <p>Clinical Teaching Conferences</p>    | <p>Clinical Rating Form<br/>Written Exam</p> | <p>Monthly<br/>Biannually</p> |
|            | <p><b>Nutrition in Kidney Transplant Recipients</b></p> <ol style="list-style-type: none"> <li>1. Pretransplant nutrition management</li> <li>2. Acute posttransplant nutrition management</li> <li>3. Longterm nutrition management.</li> </ol>   | <p>Clinical Teaching Conferences</p>    | <p>Clinical Rating Form<br/>Written Exam</p> | <p>Monthly<br/>Biannually</p> |

| Competency | Required Skill(s)  | Teaching Method(s) | Formative Evaluation Method(s)       | Frequency of Evaluation |
|------------|--|--------------------|--------------------------------------|-------------------------|
|            | <b>Socioeconomic Aspects of Kidney Transplantation</b> <ol style="list-style-type: none"> <li>1. Risks/benefits</li> <li>2. Insurance issues</li> <li>3. Quality of life</li> <li>4. Disability</li> <li>5. Job opportunities</li> </ol> | Conferences        | Clinical Rating Form<br>Written Exam | Monthly<br>Biannually   |

### III. Learning Venues:

#### A. Inpatient Service (Methodist University Hospital)

During this rotation, the renal fellows are involved in the care and management of all the kidney and pancreas transplant patients admitted to the transplant service. The transplant service is comprised of transplant nephrologist, transplant surgeon, renal transplant fellow, transplant surgery fellow, residents and Pharm Ds. Dr. Maung Mya, Medical Director of Transplant Program, provides direct supervision to the renal fellow. Daily morning rounds are performed by the transplant team. Patients are assigned to the renal fellows by the transplant team. With appropriate supervision, the renal fellows are responsible for both immunosuppressive and total management of all renal and pancreas transplant patients.

#### B. Histopathology Laboratory

This experience is aimed at providing the renal fellows with the opportunity to learn histopathologic features of various pathologies related to renal and pancreatic transplantation. The correlation among the different histopathologic findings and the clinical scenarios will expose the renal fellows to the appropriate management based on the knowledge of a complete diagnostic background.

#### C. Radiology

The renal fellows are expected to learn the basics of various imaging studies related to renal transplantation with particular consideration for ultrasonography and nuclear isotopic techniques. The fellows will be able to use the radiologic information in properly diagnosing and managing various transplant related diseases and complications.

### IV. Outpatient Clinic

The renal fellows spend two half days each week during their transplant rotation in Transplant Clinic. This experience will allow the fellows to follow a group of renal and pancreas transplant recipients for three months and manage those patients in outpatient setting. The fellows are expected to learn immunosuppression and its complications. The fellows will also gain experience in treating various comorbid conditions (i. e. diabetes mellitus, hypertension, hyperlipidemia) in transplant recipients.

### V. Conferences and Journal Clubs

A. *Transplant inpatient review meeting* every Monday at 8 A.M. The whole transplant service participates in this meeting and discusses the inpatients and the patients discharged during the past week.

- B. **Pathology Conference** meets on the second Tuesday of the month at noon in which residents and faculty present and discuss the histopathologic findings of the kidney, biopsies, and all grafts as well as other pathology related to kidney disease and kidney transplant .
- C. **Pretransplant evaluation conference** meets monthly every Friday at 8 A.M. In this conference, patients with end stage renal disease are presented and evaluated for suitability for transplant. The pretransplant workup of these patients is also discussed during this conference.
- D. **Clinical and Basic Research Conference** meets on Thursday at 2 P.M.
- E. **Fellow Conference** meets every Wednesday at 11A.M.
- F. **Biopsy Conference** meets monthly on the 4<sup>th</sup> Tuesday at 8 A.M.
- G. **Reading and Case Report Conference** meets every Friday at 11A.M.
- H. **Journal Club**
- I. **Grand Rounds** meet every Wednesday at 8 A.M.
- J. **ESRD Interdisciplinary Conference** meets bimonthly on Mondays at 1pm.

## VI. Syllabus

### A. Pretransplant Evaluation of End Stage Renal Disease Patients.

1. History and physical examination
2. Laboratory investigation
3. Cardiopulmonary evaluation
  - (a) EKG
  - (b) Echo
  - (c) Cardiac stress testing
  - (d) Chest Xray
  - (e) PFT's (Pulmonary Function Tests)

### B. Transplantation Immunobiology

1. Components of immune system
2. Major histocompatibility antigens, histocompatibility testing and crossmatching
3. The “sensitized” patient (preformed reactive antibodies)
4. Allograft rejection
  - (a) Hyperacute rejection
  - (b) Accelerated acute rejection
  - (c) Acute rejection
  - (d) Chronic rejection
5. Mechanism of rejection and cytokines involved
6. Posttransplant immunologic monitoring with serum, urinary and histologic markers

### C. Immunosuppressive Medications and Protocols for Kidney Transplantation

1. Calcineurin inhibitors; mechanism of action, side effects, drug interactions
2. Corticosteroids; mechanisms of action, side effects, drug interactions
3. Azathioprine; mechanisms of action, sideeffects, drug interactions

4. Mycophenolate Mofetil; mechanisms of action, sideeffects, drug interactions
5. TOR inhibitors; (Sirolimus) mechanism of action, side effects, drug interactions.
6. Monoclonal and polyclonal antibodies
  - (a) OKT3
  - (b) Thymoglobulin
  - (c) Anti CD25 (humanized antibodies)

#### **D. Immunosuppressive Protocols**

1. Protocols for cadaveric transplant
2. Protocols for living related and unrelated transplant
3. Protocols for high risk patients
4. Antirejection protocols

#### **E. Transplant Operation and Surgical Complications**

1. Organ procurement
2. Transplant surgery
3. Wound infection
4. Lymphocele
5. Bleeding
6. Graft thrombosis
7. Renal artery stenosis
8. Urinary leak
9. Ureteral obstruction

#### **F. Renal Graft Dysfunction**

1. Delayed graft function
2. Rejection (acute and chronic)
3. Chronic allograft dysfunction (nephrotoxicity, denovo or recurrent GN)

#### **G. Renal Allograft Rejection**

1. Types:
  - (a) Hyperacute
  - (b) Accelerated acute
  - (c) Acute
  - (d) Chronic
2. Causes
3. Immunopathology
4. Treatment

#### **H. Posttransplant Management and Complications**

1. Immunosuppression management

2. Hypertension and cardiovascular disease
3. Posttransplant diabetes mellitus
4. Posttransplant lymphoproliferative disorders
5. Infections (see part I)
6. Hyperlipidemia and atherosclerosis
7. Bone and mineral metabolism
8. Pregnancy
9. Posttransplant malignancies
10. Posttransplant skin diseases

#### **I. Infectious Complications of Kidney Transplantation**

1. Pretransplant screening and immunization
2. Approach to fever in kidney allograft recipients
3. CMV infection – manifestations, diagnosis, treatment
4. UTI
5. Skin and wound infections
6. Pneumonia
  - (a) Viral
  - (b) Bacterial
  - (c) Fungal and parasite
7. CNS infections
  - (a) Meningitis
  - (b) Encephalitis
8. Parvovirus infection
9. Polyoma virus infection

#### **J. Radiology of Kidney Transplantation**

1. Radiologic evaluation of living donor
2. Radiologic techniques in early posttransplant period
  - (a) Renal scan
  - (b) Ultrasonography with dopplers
  - (c) CT Scan
3. Radiologic techniques in the late posttransplant period

#### **K. Pathology of Kidney Transplantation**

1. Renal allograft biopsy: indications, technique, complications
2. Transplant rejection types
  - (a) Cell mediated acute rejection
  - (b) Antibody mediated acute rejection
  - (c) Chronic rejection

3. Cyclosporin/FK Toxicity
4. Acute tubular necrosis
5. Infections
6. Recurrent lesions

#### **L. Psychiatric Aspects of Kidney Transplantation**

1. Pretransplant psychiatric assessment
2. Early posttransplant psychiatric issues
  - (a) Anxiety
  - (b) Depression
  - (c) Delirium
3. Psychiatric Interventions
  - (a) Psychotherapeutic interventions
  - (b) Psychopharmacologic interventions

#### **M. Ethical and Legal Issues in Kidney Transplant**

1. Donation and procurement of organs according to UNOS regulations
2. Selection of patients for transplantation
3. Resource allocation issues

#### **N. Nutrition in Kidney Transplant Recipients**

1. Pretransplant nutrition management
2. Acute posttransplant nutrition management
3. Longterm nutrition management.

#### **O. Socioeconomic Aspects of Kidney Transplantation**

1. Risks/benefits
2. Insurance issues
3. Quality of life
4. Disability
5. Job opportunities

### **VII. Reading List**

#### ***Books:***

1. Handbook of Kidney Transplantation (Gabriel M. Danovitch).
2. Massry And Glasscock's Textbook of Nephrology.
3. Comprehensive Clinical Nephrology (Johnson and Feehally).

#### ***Journals:***

1. Transplantation
2. Transplantation Proceedings
3. American Journal of Transplantation

4. Transplantation Infectious Disease
5. The Graft
6. Journal of American Society of Nephrology
7. American Journal of Kidney Diseases
8. Kidney International

### **VIII. Competency Evaluation**

The ABIM standardized global assessment form will be filled out by your attending physician. Assessment of competency at the end of this rotation is done by performance of the fellows in the biannual written examination conducted by the division of nephrology. This examination includes 20-25 percent questions on transplantation.