WINTHROP-UNIVERSITY HOSPITAL
DEPARTMENT OF MEDICINE
DIVISION OF NEPHROLOGY AND HYPERTENSION

NEPHROLOGY AND HYPERTENSION FELLOWSHIP
PROGRAM CURRICULUM

DEVELOPED 10/1998, CURRENT REVISION 6/16/2009

TABLE OF CONTENTS

I. GENERAL ASPECTS OF THE PROGRAM

A. Overview of the Curriculum

A consultant in nephrology and hypertension must possess a range of attributes that includes a broad knowledge base, the ability to generate a relevant differential diagnosis based on an accurate history and physical examination, an understanding of the indications and contraindications for diagnostic and therapeutic procedures, the ability to think critically, and an appreciation of the humanistic and ethical aspects of medicine. Such attributes can emanate from a clinical training program that provides a firm foundation in pathophysiology as well as abundant exposure to patients under the supervision of experienced, thoughtful clinical teachers. Instructors in procedures must impart a thoughtful, cost-conscious approach to the use of technology as an extension of the subspecialist's craft rather than as an end in itself. The curriculum is written with this in mind and is based upon the Nephrology Core Curriculum as developed by the American Society of Nephrology Training Program Directors Committee, published in the Journal of the American Society of Nephrology (JASN) 8:1016 - 1027,1997. It is adapted to meet the local conditions and strengths of our training program.

B. General Aspects of Training

All trainees in the program must have completed a three-year residency in Internal Medicine at an institution accredited by the Accreditation Council for Graduate Medical Education (ACGME). The training program provides an intellectual environment for acquiring the knowledge, skills, clinical judgment, attitudes, and values of professionalism that are essential to the practice of nephrology and hypertension. Furthermore, the scientific basis for deriving conclusions is stressed. Professionalism requires the physician to serve the interests of the patient above his or her own self-interest. The program stresses the nephrologist as a consultant and the need to establish the skills necessary to communicate effectively with the referring physician as well as a principal caregiver to patients with primary renal disorders. While it is recognized that trainees provide substantial service to their teaching hospitals, service commitments never compromise the achievement of educational goals and objectives. Every aspect of training includes the cultivation of an attitude of skepticism and inquiry and a dedication to continuing education that will remain with the trainee throughout his/her professional career.

C. Duration of Training

The duration of the training experience is two years. At least 12 months of time is spent in inpatient and outpatient clinical nephrologic care. In addition, at least one half day per week is set aside for clinical experience in an outpatient area, for a total of 24 months. The clinical experience includes opportunities for the management of inpatient and outpatient acute and chronic renal disease. These guidelines do not preclude additional time that may be necessary for training in specific research areas or in acquiring additional clinical expertise in a defined field such as dialysis, transplantation, or renal parenchymal disease and pathology. As training progresses, the trainee will develop more independence with gradual reduction in the level and degree of supervision so that at the end of the training period the trainee will feel confident in his/her own abilities to manage independently even complicated cases. Trainees must also maintain their skills in general internal medicine and must learn to work effectively and efficiently with members of other subspecialties and other disciplines such as vascular surgery, interventional radiology and clinical pathology.

D. Program Faculty

The training program has a full-time training program director with board certification in nephrology (or the equivalent of board certification in nephrology) who is committed to the training program and related activities. The faculty, who are board certified in nephrology, provide training in the areas noted below and are available at the institution at which the program is in place or at the affiliated institution. A faculty-to-clinical-trainee ratio of at least 1 to 1 is maintained. Each full-time faculty member devotes at least 10 hours per week to teaching, research, administration and/or critical evaluation of the performance, progress, and competence of trainees. The faculty serves as role models by active participation in the clinical practice of nephrology, their own education, regional and national scientific societies, research activities, and the presentation and publication of scientific studies and scholarly reviews.

	Faculty	Clinical and Research Interests
1.	**Steven Fishbane MD** Division Chief Professor of Medicine	Anemia Research Clinical Nephrology Hypertension
2.	**John K. Maesaka MD** Chief Emeritus Professor of Medicine	Hypertension Scientific Research Clinical Nephrology
3.	**Louis J. Imbriano MD** Medical Director, Inpatient Dialysis Assistant Professor of Medicine	Clinical Nephrology Hypertension
4.	**Nobuyuki Miyawaki MD** Fellowship Program Director Assistant Professor of Medicine	Educational Research Clinical Nephrology
5.	**Naveed Masani MD** Medical Director, Mineola Dialysis Assistant Professor of Medicine	Glomerular Diseases Renal Artery Stenosis

E. Key Non-Faculty Personnel

Our Academic Coordinator, Joan Roughley, is available to assist you with the specifics of the fellowship training program, including conference schedules, request for vacation time and reimbursements for travel expenses related to academic presentations. Our Academic Coordinator, along with our Program Director, will assist you with issues as they arise during the course of the fellowship training.

F. Facilities and Resources

The Nephrology and Hypertension program operates out of Winthrop-University Hospital for both clinical and research training as part of a single integrated program. Training in renal transplantation occurs at the Columbia University for Physicians and Surgeons in New York City. Winthrop-University Hospital is a 500 bed facility providing primary care for patients in the geographical area and is a tertiary referral center. This provides for a wide spectrum of patients for the program including both acute and chronic conditions as well as highly complex cases. End stage renal disease (chronic dialysis) is managed at two sites, namely Winthrop-University Hospital Dialysis at Mineola (35 stations) and Bethpage (12 stations). The patient population provides extensive experience in both inpatient and outpatient consultations with supervision by attending physicians. Each full time faculty member has at least one ambulatory session per week with new consultations and defined follow-ups seen by the trainee. The laboratory facilities at Winthrop-University Hospital provide opportunities for sophisticated basic research under the direction of a faculty member with close established collaborations with members of the basic science faculty.

The medical center in which the program operates provides sufficient numbers of new and follow-up patients to ensure adequate inpatient and outpatient experience with a diversity including pregnant, adolescent, and geriatric patients and wide ethnic diversity. Computers are available permitting the trainees to establish databases of their own. Supporting services include a full-service emergency room, diagnostic and interventional radiology units, pathology laboratory, medical imaging and nuclear medicine units. Both institutions have modern, fully staffed units for the intensive care of critically ill patients with renal disorders. A well-stocked library with extensive computer and librarian services is available at both sites.

G. Nephrology Fellowship Rotations

Typical Rotations in Months

Rotation	1st Year Fellowship	2nd Year Fellowship
Inpatient Consultation Service	4 months	2 months
Inpatient ESRD Service	4 months	2 months
Outpatient Dialysis Service	2 months	4 months
Transplantation Service at Columbia-Presbyterian	0 months	2 months
Research Rotation	2 months	2 months
Nephrology Ambulatory Care	Weekly for the entire duration of the fellowship	
Vacation	4 weeks	4 weeks

H. Program Director's Message

We strive to make this fellowship training as educationally fulfilling, physically and emotionally supportive, intellectually stimulating and accessible at all times. I encourage the fellows to come speak to me and/or any of our faculty with any suggestions, comments or questions. Your input is vital to the continued enrichment of our program.

II. SPECIFIC PROGRAM CONTENT

A. Patient Care Experience

The duration of the core curriculum is 24 months of which the patient care component is at least 12 months. The inpatient experience on the renal consultative service is approximately 6 months. Another 6 months is devoted to the inpatient ESRD service. Five months is devoted to chronic dialysis. Two months are for training in renal transplantation at Columbia University in New York City. In addition to this, at least one half day per week is set aside for clinical experience in the outpatient setting throughout the 24 month training period. Adequate numbers of routine vascular access procedures will be performed during the 24 months, as well as percutaneous biopsies of native and transplanted kidneys. All trainees have appropriate supervised experience to develop skills in providing consultative services and communicating with physicians and other members of the health care team.

All trainees are required to participate in three months of clinical or basic research. The possibility of electives in pediatric nephrology, interventional radiology and urology also exist. For those individuals intent on an academic career, a structured basic research protocol is developed. These individuals are still required to attend at least 1 outpatient session per week during their subsequent years of training.

B. Non-Patient Care Activities

The development of independent study and a scholarly approach to education are emphasized by reading current textbooks and monographs, relevant scientific literature, and distributed syllabus materials. The trainees are also supported to attend one major national nephrological meeting per year, and are encouraged to join these organizations and participate in their activities. They are also supported to attend one national meeting per year, and encouraged to attend other meetings as appropriate.

The trainee is also mandated to attend conferences that pertain to subspecialty training. Weekly journal club covers a wide array of the nephrologic literature. Fellows present a recent article describing an original research study. Both the content of the study and the statistical and underlying research design issues are discussed. The first journal club of each month is a research conference where Winthrop Nephrology research is discussed. A weekly clinical conference is also mandated. For the clinical conference, the fellow presents a recent case first seen in the hospital. The ensuing discussion examines all aspects of the renal disease, and often includes a review of pathology slides. Discussion of clinical decision making, medical economics, evidence-based medicine and ethical issues allows for a broader outlook on discussed cases. In each training year, there is an average of one weekly core curriculum lecture. These lectures cover the diverse areas of nephrology.

The trainees participate in the teaching of medical students, medical residents and less advanced trainees in nephrology. The ability to interweave basic and clinical material in a cohesive manner and to present and defend concepts in an open forum is an invaluable learning experience in the formative years of a career.

C. Evaluation of Trainee Competence

Formal procedures have been established for trainee assessment and feedback. The performance of the fellows through the duration of fellowship training is based on achieving these competency based goals and expectations. The elements of competence include:

1. PATIENT CARE

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

- communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
- gather essential and accurate information about their patients
- make informed decisions about diagnostic and therapeutic interventions based on patient information and preferences, up-to-date scientific evidence, and clinical judgment
- develop and carry out patient management plans
- counsel and educate patients and their families
- use information technology to support patient care decisions and patient education
- perform competently all medical and invasive procedures considered essential for the area of practice
- provide health care services aimed at preventing health problems or maintaining health
- work with health care professionals, including those from other disciplines, to provide patient-focused care

2. MEDICAL KNOWLEDGE

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

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

3. PRACTICE-BASED LEARNING AND IMPROVEMENT

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

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

4. INTERPERSONAL AND COMMUNICATION SKILLS

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

- create and sustain a therapeutic and ethically sound relationship with patients
- use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills
- work effectively with others as a member or leader of a health care team or other professional group

5. PROFESSIONALISM

Residents must demonstrate a commitment to carrying out professional responsibilities, adherence to ethical principles, and sensitivity to a diverse patient population. Residents are expected to:

- demonstrate respect, compassion, and integrity; a responsiveness to the needs of patients and society that supersedes self-interest; accountability to patients, society, and the profession; and a commitment to excellence and on-going professional development
- demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices
- demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

6. SYSTEMS-BASED PRACTICE

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

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

The trainees are evaluated on an ongoing basis during the course of patient care rounds, procedures and conferences. Formal evaluation forms that follow ACGME guidelines are completed each month on each trainee by the Attending Nephrologist that the trainee was in most contact with during the course of that month. The Attending Nephrologist discusses the evaluation with the trainee within two weeks of completion of the rotation. All trainees are evaluated by the faculty at a quarterly staff evaluation meeting. Formal feedback to the trainee is provided by the Program Director at four-monthly intervals and corrective measures are instituted if necessary.

The trainees may be evaluated using multiple methods to assess their achievement of learning goals and objectives for each fellowship rotation. These methods may include:

D. Procedural Skills

There is no absolute measure of procedure competence hence it is difficult to define and quantitate what constitutes competence. The trainee and faculty must both be confident by the completion of training that the resident has achieved competence for the individual procedure. The threshold number for assessing competence for vascular placement is widely accepted as approximately 3; i.e. 3 supervised successful femoral vein catheter insertions. The issue of competence in performing percutaneous renal biopsies is more complex. Six kidney biopsies are deemed a reasonable measure of competence. A log of all procedures performed is kept in the Nephrology Office and at the completion of the training period. Copies are entered into the trainee's file as a permanent form of documentation.

E. Program, Faculty and Fellow Evaluation

Program evaluation is performed on three major levels.

Fellow's Evaluation of the Program: Monthly the fellow completes an evaluation of the program content in that month's rotation. Every 4 months, the program director meets individually with each trainee and obtains feedback regarding the strengths and weaknesses of the program as viewed by the trainee. This information is relayed to the faculty. Changes are instituted consequent to these evaluations. The fellows are also encouraged to meet with the program director at any time to discuss any issues that they have in mind; this is to ensure that the training program provides the highest degree of support to the fellows' wellbeing, interests and learning.

Fellow's Evaluation of the Faculty: With regard to faculty assessment by the trainees, this is performed on a monthly basis. At the completion of each rotation, the fellow completes an evaluation of the faculty member he/she worked with. This information is kept in a file, and used by the program director. Anonymous compilations of the evaluation are reviewed with each individual faculty.

Faculty, Health Care Staff, and Patient Evaluation of the Fellows: Monthly the faculty completes an evaluation of the fellows' performance from that month's rotation based on the six areas of competency as outlined above. Ambulatory continuity clinic evaluations are completed every 4 months. In addition, 360 degree evaluation from the nurses, ancillary staff, secretarial staff, administrators and other health care professionals will be obtained for a comprehensive evaluation of the fellow's performance. Evaluations from the patients in the ambulatory setting will be obtained. Focused observation and evaluation also referred to as Mini CEX may also be utilized. Fellows also will be asked to complete a self-evaluation in the areas of competency. Every 4 months, the program director meets individually with each trainee and provides feedback regarding the strengths and weaknesses of the fellow as viewed by the faculty. Constructive feedback with plan implementation is provided by the program director to the trainee. The program director also provides a summative annual evaluation of the fellows with a written documentation of their performance during the year and their competency.

Summary of Evaluations Utilized During Fellowship Training

Evaluation Tools	Aim	Evaluator
Formative Monthly Evaluation of Fellows		
Faculty Evaluation of Fellow	Faculty will evaluate fellow performance during each rotation and document this evaluation at end.	Faculty
Faculty Evaluation of Fellow's Research Rotation	Provide feedback on their participation in research rotation	Dr. Fishbane/ Research Adviser
Formative Four Month Ambulatory Continuity Evaluation of Fellows		
Faculty Evaluation of Fellow for Ambulatory Continuity Care Clinic	Faculty will evaluate fellow performance for Ambulatory Continuity Care	Faculty
Formative Semi-Annual Evaluation of Fellows		
Peer Evaluation	Provide opportunity for fellows to evaluate our co-fellows	Fellows
Patient Survey	Obtain insight from patients on the care provided by the fellows	Patients
Fellow's Self Assessment	Obtain insight and allow self reflection on individual strengths and weaknesses	Individual Fellows
360 Evaluation of Fellow	Provide feedback of fellows from various healthcare professionals	Nurses, Nurse Managers, N.P.
Formative Semi-Annual Evaluation of Fellows with Feedback		
Four Months Evaluation Meeting of Program Director with Fellow	Provide a written documentation of Evaluation Review Meeting	Program Director with a face-to-face review with fellow; ambulatory care performance discussed
Summative Annual Evaluation of Fellows		
Annual End of Year Summative Evaluation with Program Director	Provide a written documentation of their performance during the year and their competency	Program Director with a face-to-face review with fellow
Summative End of Training Evaluation of Fellows		
End of Training Summative Evaluation with Program Director	Provide a written documentation of their performance during the fellowship and their competency	Program Director with a face-to-face review with fellow
Monthly Evaluation of Faculty		
Fellow's Anonymous Monthly Evaluation of Attendings	Fellows will evaluate the faculty's effectiveness as teachers	Fellows
Fellow's Anonymous Monthly Evaluation of Rotation	Fellows will provide objective assessment of each rotation in achieving the goals and objectives identified for that curriculum	Fellows
Four Month Evaluation of Faculty		
Fellow's Anonymous Evaluation of Ambulatory Teaching	Fellows will evaluate the faculty's effectiveness as teachers in ambulatory setting	Fellows

III. CLINICAL CURRICULUM: AREAS OF KNOWLEDGE

A. Glomerular Diseases

Rationale:
Glomerular disease presents as an idiopathic entity or part and parcel of a systemic disease. While the diagnostic approach is similar in most instances, the therapeutic options and prognostic outcome differ markedly between disease entities. An understanding of the pathophysiology of the different glomerulopathies will afford a clearer understanding of the disease process.

Program content:

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

   i. Structure and function of the normal glomerulus and how alterations of these leads to the cardinal feature of glomerular injury (proteinuria and reduced GFR).
   ii. Principal immunologic mechanisms causing human glomerular diseases and the features that distinguish them by immunofluorescence and electron microscopy.
   iii. Fundamental features of the normal immune response and an awareness of current concepts of autoimmunity and the factors that may be responsible for, and mediate immunologic glomerular

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

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

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

   i. Minimal change nephropathy presenting in adolescents and adults, especially the response to corticosteroid treatment, the development of acute renal failure in adults, and the association with malignant tumors.
   ii. Membranoproliferative glomerulonephritis, including types I, II, and III, and the clinical and pathological features of this disorder in association with hepatitis C and cryoglobulinemia.
   iii. Focal segmental glomerulosclerosis (FSGS), including its various pathological and clinical syndromes and the association with conditions of reduced renal mass.

iv. The demographics, clinical course, and outcome of the clinicopathologic syndromes of primary focal segmental glomerulosclerosis, including collapsing FSGS, glomerular tip lesion, and perihilar FSGS.
v. Membranous nephropathy, including the clinical, pathological, and diagnostic features of both idiopathic membranous nephropathy and secondary membranous disease, and in-depth knowledge of the controversies regarding treatment of this disease.
vi. IgA nephropathy, especially its clinical course, natural history, and prognostic makers.
vii. Postinfectious glomerulopathies, including bacterial viral, parasitic, rickettsial, and fungal infections, and their epidemiology, clinical course, and response to therapy, especially with respect to HIV infections.

d. Trainees should develop an in-depth knowledge of glomerular disease associated with systemic diseases with respect to pathology, clinical and serological features, and response to treatment of:
i. Necrotizing and crescentic glomerulonephritis
ii. Anti-glomerular basement membrane disease
iii. Immune complex diseases, including lupus nephritis, postinfectious glomerulonephritis, and Henoch-Schonlein purpura.
iv. Pauci-immune glomerulonephritis and small vessel vasculitis
v. Renal manifestations of other rheumatic disorders, including systemic sclerosis, Sjogren's syndrome, mixed connective tissue disease, rheumatoid arthritis, Bechet's syndrome, relapsing polychondritis, and familial Mediterranean fever.
vi. Renal disease in the dysproteinemias, including multiple myeloma, amyloidosis, fibrillary glomerulopathy, immunotactoid glomerulopathy, and mixed cryoglobulinemia.

Patient care experience:
Trainees should be familiar with and have experience in:

a. Diagnosis and management of patients with isolated proteinuria, hematuria, nephrotic syndrome, and acute glomerulonephritis.
b. Serological evaluation of glomerulonephritis, including the diagnostic value and limitations of anti-glomerular basement membrane (anti-GBM), ANCA, antinuclear and anti-microbial antibodies, hypocomplementemia, and cryoglobulinemia.
c. Indications for and complications of renal biopsy, as well as the morphological and immunohistological features of the major glomerular diseases.
d. Treatment of patients with nephrotic syndrome and acute glomerulonephritis$_1$ both renal-limited and secondary to systemic disease, including the indications, complications, and value of various immunosuppressive protocols.

Principal teaching methods:

Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

B. Diabetes Mellitus and Diabetic Nephropathy

Rationale:

Diabetic nephropathy is perhaps the commonest cause of end stage renal failure seen in clinical practice. The rationale behind this curriculum is to expose the trainee to the diverse array of issues related to diabetic nephropathy in the context of a chronic systemic disease that has devastating effects on many target organs, and in particular the kidney

Program content:

A. Trainees should acquire a general understanding of current concepts of the pathophysiology of diabetic glomerulosclerosis (DGS), including:

1. Epidemiology and course of nephropathy in insulin-dependent diabetes mellitus (IDDM) and non-insulin-dependent diabetes mellitus (NIDDM)
2. Pathophysiological mechanisms and histologic manifestations of diabetic nephropathy (DN)
3. Strategies for prevention of DN
4. Therapy of established DN
5. Modalities of therapy for end-stage renal disease (ES RD) in DN, including hemodialysis and peritoneal dialysis, kidney transplantation, and kidney pancreas transplantation

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

1. Various ways in which diabetes mellitus (DM) may affect the kidneys and urinary tract
2. Cardinal clinical and histological features, as well as the epidemiology and course of diabetic glomerulosclerosis (DGS) in patients with IDDM and NIDDM
3. Results of clinical trials designed to prevent DN or slow its progression
4. Relative merits of different modalities of therapy for ESRD in diabetic patients. including hemo- and peritoneal dialysis, kidney transplantation, and kidney/pancreas transplantation

C. Trainees should be familiar with:

1. Definition, interpretation, prognostic value, and clinical use of microalbuminuria[3,]

2. Unique medical and surgical problems facing patients with advanced DN as well as their management

Patient care experience:

A. Trainees must have experience in the evaluation and management of patients with progressive diabetic nephropathy[1] both insulin-dependent and non-insulin-dependent. Experience with treatment of blood pressure, fluid-electrolyte, glycemia, and non-renal diabetic complication is needed.

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

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

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

Principal teaching methods:

Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

C. Hypertension

Rationale:

Hypertension is a common entity handled by the practicing nephrologist. While the vast bulk of hypertension problems can be dealt with in the ambulatory setting[1] management of elevated blood pressure in the inpatient setting is not a rare occurrence. This curriculum will provide the trainee with an understanding of the pathophysiology and pharmacologic management of hypertension.

Program content:

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

1. Epidemiology of hypertension
2. Pathogenesis and natural history of primary hypertension
3. Evaluation of the hypertensive patient
4. Nonpharmacologic therapies of hypertension
5. Pharmacology and clinical use of antihpertensive agents
6. Hypertension in renal parenchymal disease during chronic dialysis and after renal transplantation
7. Renovascular hypertension: pathogenesis, causes, clinical features, screening and diagnostic tests, and management
8. Oral contraceptive-induced hypertension
9. Pheochromocytoma: pathophysiology, clinical features, diagnosis, and management
10. Primary aldosteronism: pathophysiology, clinical features, diagnosis, and management

11. Other forms of secondary hypertension: Cushing's syndrome, congenital adrenal hyperplasia coarctation of the aorta, thyroid disease, hyperparathyroidism, acromegaly, sleep apnea and drugs
12. Hypertensive emergencies and urgencies

Patient care experience:

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

1. Trainees must be able to assess the severity of hypertension and end-organ damage. They should be familiar with the role of ambulatory blood pressure monitoring in the evaluation of the hypertensive patient
2. Trainees must be able to define goals of treatment, be familiar with the non-pharmacologic modalities as well as the use and side-effects of antihypertensive agents, and be able to make appropriate therapeutic choices in the context of comorbid conditions.
3. Trainees must be familiar with the management of hypertension in renal parenchymal disease during chronic dialysis and after renal transplantation.
4. Trainees must be able to identify symptoms and signs suggestive of secondary causes of hypertension and be familiar with the various screening and diagnostic tests as well as management of these disorders.
5. Trainees must become familiar with the management of the various hypertensive emergencies and urgencies.

Principal teaching methods:

Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

D. Acute Renal Failure and Intensive Care Unit Nephrology

Rationale:

The intensive care unit is a common setting where the practicing nephrologist manages acute renal failure and its sequelae. Renal replacement therapy is often needed. The rationale behind this curriculum is to teach the trainee the skills required to manage a patient with acute renal failure in the setting of multiorgan failure

Program content:

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

1. Normal regulation of renal and glomerular hemodynamics
2. Differential diagnosis of acute renal failure
   a. Pathophysiology of prerenal azotemia
   b. Pathophysiology of intrinsic renal failure$_1$ including acute glomerular diseases, acute tubular necrosis, and acute interstitial disease

c. Pathophysiology of obstructive renal failure
3. Mechanisms of acute renal failure (ARF) in the postoperative patient
4. Mechanisms of ARF in patients with hepatobiliary disease
5. Cause of ARF in patients with cancer and immunosuppression
6. Causes of ARF in patients with AIDS
7. Metabolic consequences of ARF
   a. Hormonal
   b. Nutritional
   c. Electrolyte
   d. Acid -base
   e. Volume
8. Evaluation and management of ARF
   a. Radiological techniques of ARF
   b. Biochemical evaluation of ARF
   c. Role of the renal biopsy in ARF
   d. Nondialytic therapy
   e. Dialytic therapies Role of hemodialysis
      ii. Role of peritoneal dialysis
      iii. Role of continuous renal replacement therapy (CVVH, CVVHD, CVVHDF)
9. Hemodynamic monitoring of the critically ill patient
10. Management of electrolyte/acid-base disturbances in critically ill patient
11. Fluid management of the critically ill patient
12. Use of vasoactive drugs in the critically ill patient
13. Role of extracorporeal drugs in the critically ill patient of drug overdose$_1$ specifically ethylene glycol, methanol, lithium, theophylline, salicylate, and barbiturate

Patient care experience:

A. Trainees must have experience in the evaluation and management of acute renal failure
B. Trainees must have experience in the evaluation and management of fluid-electrolyte and acid-base disturbances in the critically ill patient
C. Trainees should have experience in the evaluation of hemodynamics and the proper use of fluid and vasoactive drugs in critically ill patients.
D. Trainees should have experience in the use of various dialytic techniques, including hemodialysis, peritoneal dialysis, and continuous venovenous hemodialysis.
E. Trainees should have experience in the use of extracorporeal therapy to remove specific toxins
F. Trainees should have experience in the placement of central lines.

Principal teaching methods:

Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

E. Chronic Renal Failure

Rationale:

Chronic renal failure and its sequelae are perhaps the commonest reason for a primary care physician to obtain a nephrology consultation. In this curriculum the trainee will be familiarized with a spectrum of entities associated with chronic renal failure.

Program content:

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

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

Patient care experience:

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

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

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

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

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

Principal teaching methods:
Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

F. Dialysis

Rationale:
The various modalities of dialysis constitutes the mainstay of renal repla~ement~ therapy. This rationale behind this component of the curriculum is to provide the trainee with the tools of this modality of therapy, based on a solid understanding of the physiology of the artificial kidney.

Program content:

A. Types, advantages, disadvantages$_1$ complications$_1$ and management of acute and chronic hemodialysis and peritoneal dialysis access.
B. Available water treatment and dialysis delivery machines for hemodialysis and connections and cycling systems for peritoneal dialysis
C. Currently available hemodialyzers and their advantages and disadvantages$_1$ with emphasis on differences in membrane composition, biocompatibility$_1$ and solute and water flux
D. Importance of and correct method of determining the dialysis prescription for hemodialysis and peritoneal dialysis and of monitoring the actual delivered dose of dialysis
E. Most common complication of hemodialysis, including hypotension, cramps, arrhythmias, hemolysis$_1$ and air embolism
F. Most common complication of peritoneal dialysis, including peritonitis, hypotension, hernias, dialysate leaks, and inadequate dialysis
G. Available techniques, advantages, and possible drawbacks of dialyzer reprocessing
H. Continuous dialytic therapies, including continuous arteriovenous hemodiafiltration and continuous venovenous hemodiafiltration.
I. Nutritional consideration and management of ESRD patients
J Evaluation and management of complications of ESRD, including anemia, renal osteodystrophy, dialysis amyloidosis, hypertension, hyperlipidemia, and acquired cystic disease.
K. Appropriate use of drugs, including dose modifications for dialysis patients
L. Role of Medicare, and Health Care Financing Administration, Networks, US Renal Data System, and voluntary organizations/societies (e.g., National Kidney Foundation, the ASN, and the Renal Physicians Association) in the delivery and financing of care for ESRD patients.

Patient care experience:

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

Principal teaching methods:
Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

G. Acid-Base Disorders

Rationale:
The practicing nephrologist is frequently called upon to mange disorders of acid-base homeostasis. Through the teaching of the basic physiology of acid-base homeostasis the trainee will be in a position to provide a scientific analysis of the abnormalities of acid-base homeostasis in the clinical setting. This constitutes the rationale behind this component of the curriculum.

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

1 Acid-base chemistry and buffering
2. Determinants of arterial carbon dioxide tension and carbon dioxide balance
3. Determinants of plasma bicarbonate concentration and hydrogen ion balance, including renal acidification processes and the physiology of bicarbonate reabsorption, titratable acid excretion, and ammonium excretion
4. Clinical evaluation of acid-base disorders
5. Renal tubular acidosis: pathogenesis$_1$ clinical features, causes, diagnosis, and management
6. Uremic acidosis: acid-base homeostasis in ESRD
7. Other types of metabolic acidosis: pathogenesis, clinical features, causes, diagnosis, and management
8. Metabolic alkalosis: pathogenesis, clinical features, causes, diagnosis, and management
9. Respiratory acidosis: pathogenesis$_3$ clinical features$_3$ causes, diagnosis, and management
10. Respiratory alkalosis: pathogenesis, clinical features, causes, diagnosis, and management.

11. Mixed acid-base disturbances

Patient care experience:

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

1. Trainees must assess the accuracy of the acid-base parameters and interpret serum and urine acid-base data, including the anion gap
2. Trainees must determine from the patient's history, physical findings, and laboratory data the nature of the prevailing acid-base disorder and whether a simple or mixed acid-base disorders present.
3. Trainees must have experience in managing renal tubular acidosis, uremic acidosis, and acid-base homeostasis in end-stage renal disease.
4. Trainees must have experience managing all other types of metabolic acidosis.
5. Trainees must have experience in the management of metabolic alkalosis.
6. Trainees must have experience in the management of respiratory acidosis and alkalosis.
7. Trainees must have experience in the management of mixed acid-base disorders.

Principal teaching methods:

Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

H. Fluid and Electrolyte Disorders

Rationale:

The practicing nephrologist is frequently consulted to manage fluid and electrolyte disorders. The rationale behind this component of the curriculum is to teach the trainee the basic physiology of fluid and electrolyte disorders thereby providing a basis for the understanding of the abnormal physiology$_1$ with an emphasis on the practical application of patient care.

Program content:

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

1. Physiology of sodium balance, including sensors of extracellular volume: effector systems, tubular sodium transport processes, and the regulation of renal sodium excretion
2. Hypovolemia: pathophysiology, causes, clinical features, diagnosis, and management
3. Edematous disorders: pathophysiology, causes, clinical features, diagnosis and management
4. Clinical use and complications of diuretics
5. Physiology of water balance, including tonicity sensors, effector systems, the countercurrent mechanism for urine concentration, the cellular physiology of collecting duct water reabsorption, and the regulation of water excretion by the kidney.
6. Hyponatremia: pathophysiology, causes, clinical features, diagnosis, and management
7. Hypernatremia: pathophysiology, causes, clinical features, diagnosis and management

8. Evaluation and management of the polyuric patient

9. Physiology of potassium balance, including the regulation of transcellular potassium movement, tubular transport processes for potassium reabsorption and secretion, and the regulation of potassium excretion by the kidney
10. Hypokalemia: pathophysiology, causes, clinical features, diagnosis, and management
11. Hyperkalemia: pathophysiology, causes, clinical features, diagnosis, and management
12. Disorders of sodium, water, and potassium balance in end-stage renal disease

Patient care experience:
Trainees should be familiar with the have experience in the following areas in both the outpatient and inpatient settings:

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

Principal teaching methods:
Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

I. Cystic and inherited Disease of the Kidney

Rationale:
Cystic disease of the kidney is the third commonest cause of ESRD. This curriculum will provide the trainee with the basic information regarding the different presentations of renal cystic disease, its consequences and management.

Program content:
A. Trainees should acquire knowledge of the following areas:

1. Genetics of inherited diseases
   a. Understanding of Mendelian genetics
   b. Understanding of gene linkage analysis
   c. Knowledge of chromosomal localization and characteristics of the gene responsible for the more common inherited renal disorders.
2. Clinical, diagnostic and epidemiologic differences between simple, acquired and inherited cystic disorders and their potential for renal malignancies
3. Diagnosis of inherited and cystic disease
   a. Use of gene link analysis and mutational analysis in the screening
   b. Role of urinalysis, renal function testing, and radiologic testing
   c. Possibilities of prenatal diagnosis and pretest counseling
4. Approach to the symptomatic patient
   a. Familiarity with the natural history of inherited cystic and noncystic disease
   b. Knowledge of clinical presentations
   c. Familiarity with extrarenal manifestations.
5. Treatment
   a. Knowledge of strategies to manage progression of renal failure, proteinuria, and hypertension in non-cystic inherited disease
   b. Knowledge of management of pain, hypertension, renal stone, hematuria, infection, and progressive renal failure in patients with cystic disease
   c. Familiarity with management of extrarenal manifestation of ADPKD, including mitral valve prolapse, diverticular disease, intracranial aneurysm, and hepatic cystic disease

Patient care experience:

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

B. Trainees should have experience in the diagnosis and management of patients with non-cystic inherited diseases$_1$ with emphasis on Alport's syndrome and its renal and extrarenal complications.

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

Principal teaching methods:

Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

J. Tubulo-Intersitial Disease and Urinary Tract Infections

Rationale:

The rationale behind this component of the curriculum is to instruct the trainee in the pathology and management of urinary tract infections and in a broader sense, the evaluation of individuals with disease processes that primarily involve the renal interstitium.

Program content:

A. Trainees should acquire a general understanding of:

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

Patient care experience:

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

B. Trainees should be familiar with:
    1. Pathological features of acute and chronic interstitial nephritides

2. Clinical laboratory tests to evaluate aspects of tubular function, concentrating ability, urine acidification, potassium handling, and various reabsorptive functions

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

Principal teaching methods:
Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

K. Disorders of Divalent Cation and Mineral Metabolism

Rationale:
Disorders of calcium, phosphate and magnesium metabolism occur as distinct entities or as a component of the spectrum of abnormal metabolism that accompanies chronic renal insufficiency and ESRD. This curriculum will provide a physiologic basis and instruct the trainee in the practical management of these common disorders.

Program content:
Trainees must acquire knowledge and understanding of the following areas during the course of their training:

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

Patient care experience:

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

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

Principal teaching methods:
Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

L. Transplantation

Rationale:

Renal transplantation is a well established modality of renal replacement therapy. This is a constantly evolving and complex field of expertise. The rationale behind this curriculum is to implant in the trainee the basic tenets of transplantation immunology and familiarize him with the ongoing management of patients who have undergone renal transplantation.

Program content:

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

B. Transplant Pharmacology
   1. Basic principles of pharmacology and the mechanisms of action of immunosuppressant agents including glucocorticoids$_3$ azathioprine mycophenolate mofetil, cyclosporine, tacrolimus sirolimus, and monoclonal and polyclonal antibodies
   2. Basic principles of pharmacology of non-immunosuppressive medications used in transplant for the prophylaxis of infection and the treatment of concurrent illnesses with an emphasis on anticipating and managing drug interactions

C. Organ Sharing and Allocation

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

12. Special considerations of pancreas and kidney/pancreas transplantation

E. Infectious diseases in transplantation/pre- and post- transplantation
F. Pregnancy and transplantation
G. Cancer and transplantation
H. Ethic of transplantation
I. Economics of transplantation

Patient care experience:
A. Pre-transplant: education, counseling, and evaluation of donor and recipient
B. Immediate postoperative management: evaluation and management of extracellular fluid volume, falling urine outputs, and primary nonfunction of the transplanted kidney
C. Early post-transplant management: establishment of adequate immunosuppression; diagnosis and therapy of rejection, infection, the hemolytic uremic syndrome and urological and vascular complications; and diagnosis and management of drug interactions and toxicities.
D. Long-term post-transplant management: assessment for adequacy of immunosuppression; management of complications of long-term immunosuppression, including medication-induced allograft dysfunction, recurrence of the primary disease, de novo post-transplant glomerulonephritis, post-transplant polycythemia, avascular necrosis, dyslipidemias, glucose intolerance, liver function abnormalities, lymphoproliferative disease, and cancers affecting the skin and other organs

Principal teaching methods:
Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

M. Renal Disease in Pregnancy

Rationale:
The practicing nephrologist is not uncommonly consulted for management of hypertension in pregnancy. Furthermore, patients in the early stages of chronic renal insufficiency are fertile as are renal transplant recipients. The rationale behind this curriculum is to provide the trainee with an opportunity to manage renal disease in the pregnant female.

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

1. Changes in the anatomy and function of the urinary tract during pregnancy, focusing on the relevance of these changes to clinical circumstances, stressing alterations in the calyces and ureters, renal hemodynamics, and tubular function (principally potassium and glucose)
2. Changes in acid-base metabolism in pregnancy, focusing on normal pH, HCO_3 and PCO_2
3. An integrated view of volume homeostasis during pregnancy. This includes knowledge of the normal gestational changes in weight, intravascular and extracellular volume status, renal salt handling, and the production of volume-regulating hormones.

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

Patient care experience:

Trainees must diagnose and manage women whose pregnancies are complicated by acute or chronic renal dysfunction as well as gestations complicated by hypertension. They should have exposure to the presentation and management of gravidas experiencing acute hypertensive crises, especially those crises complicated by systemic manifestations such as liver dysfunction, thrombocytopenia$_1$ and microangiopathic hemolytic anemia.

Principal teaching methods:

Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

N. Renal Function Testing

Rationale:

Application of the relevant test of renal function to a situation at hand has obvious connotations. These ancillary tests play an important role in the evaluation of renal disease.

The rationale behind this curriculum is to teach the trainee the judicious and cost effective application of renal function tests to the diagnosis and monitoring of renal disease.

Program content:

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

1. Urinalysis, including dipstick and sediment
2. Measurement of renal plasma flow and GFR, including interpretation of serum creatinine concentration and calculation of its clearance rate

3. Measurement of renal concentrating and diluting capacity
4. Measurement of microalbuminuria
5. Measurement of proteinuria, using semiquantitative and quantitative methods
6. Assessment of urinary acidification
7. Assessment of renal sodium and potassium handling
8. Renal radiology
    a. Urography
    b. Ultrasonography
    c. Radionuclide scans
    d. Computed tomography
    e. Magnetic resonance imaging
    f. Renal circulation imaging (angiography)

Patient care experience:
Trainees must be given sufficient direct experience to develop expertise in their performance and interpretation of;

1. Urinalysis
2. Accurate and timed complete collection of urine for renal function testing$_1$ proteinuria, and microalbuminuria
3. Fractional excretion of electrolytes
4. Renal function clearance studies

Principal teaching methods:
Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

O. Pharmacology of Drugs in Renal Disease

Rationale:
The kidney is a major route whereby drug and drug metabolites are excreted from the body. Accordingly, dose adjustments of many medications are required in individuals with renal dysfunction. Along different lines many commonly used medications have nephrotoxic side effects. In this curriculum the trainee will learn the pharmacology of drugs in renal disease and the nephrotoxic effects of others.

Program content:
Trainees must acquire knowledge and understanding of the following areas during the course of their raining:

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

9. Renal transplant immunosuppression

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

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

Principal teaching methods:
Inpatient and outpatient experiences are involved. Details of inpatient and outpatient teaching methods are found in section IV.

P. Professionalism and Ethical Conduct

Rationale:
Professionalism and ethical conduct is a sine qua non in the practice of medicine. The trainee will be taught these key attributes to be carried with him/her throughout their professional lives.

Program content:
The resource document entitled Project Professionalism, from the American Board of Internal Medicine (ABIM; Philadelphia, 1995), will be used to assist trainees in the acquisition of knowledge and understanding of the following areas during the course of training:

1. Elements of professionalism

a. Altruism
b. Accountability, dependability$_1$ responsibility, and prudence
c. Excellence, but humility; continued education; commitment
d. Duty, justice, collegial collaboration
e. Honor and integrity, honesty and fidelity, trustworthiness
f. Respect for others, compassion, empathy
g. Common sense

2. Threats to professionalism

a. Abuse of power and position, sexual and other harassment
b. Arrogance, prejudice, bias
c. Greed and selfishness
d. Misrepresentation, clinical and scientific misconduct
e. Impairment, including substance abuse
f. Lack of conscientiousness

g. Conflicts of interest

Principal teaching methods:
Personal example will constitute the major teaching modality

Evaluation:
1. See section on evaluation in section IV
2. When necessary, providing a mechanism for remediation of professional and ethical deficiencies.

Q. Research Design, Methods, and Responsible Conduct

Rationale:
The rationale behind this component of the curriculum is to provide the trainee with a hands on experience in performing either clinical or basic research. This experience will set the foundation for a career based on a scientific approach to medicine

Program content:
Trainees must acquire knowledge and understanding of the following areas during the course of their training:

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

Research experience:
The research experience can be acquired in various areas including, but not limited to physiology, biochemistry, pharmacology, pathology, or clinical research

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

B. Trainees working on a clinical research project in a general clinical research center admit study subjects to the center, participate in obtaining informed consent, and play an active role in the study.
C. Trainees participating in clinical outcomes studies must be familiar with the methods used to acquire data and should participate in a meaningful way in the analysis of such information.
D. Trainees should participate in the preparation of abstracts, manuscripts, or reports that originate as a result of the studies.

Principal teaching methods:

A. Participation in a Research Project: Emphasis is placed on data generation, collection and analysis. With regard to bench research the resident is instructed in, and gains practical experience in a number of basic techniques that include centrifugation, solution preparation, techniques of tissue culture, specific biochemical assays and in some instances principals of gel preparation arid loading. With regard to clinical research the resident is instructed in, and gains practical experience in patient recruitment, patient interviews, collection and analysis of relevant samples and compilation of criteria relevant to that project.

B. Design of a Research Project: The resident is instructed in the fundamentals of development of a research project. This includes the importance of formulating a clear hypothesis, outlining the specific objectives to be attained, critically evaluating the literature and delineating the gaps to be filled, detailing the experimental approach, pointing out potential pitfalls with alternative approaches as a back-up, and delineating the statistical analysis of the findings. In the case of clinical trials that involve human subjects, the importance of the concept of informed consent is stressed. The humanistic aspects of experiments requiring animal investigation are also emphasized.

C. Authorship of Manuscripts: The resident is instructed in the fundamentals of scientific writing$_1$ with a need to pay scrupulous attention to details. Reporting findings vs interpreting observations is stressed. As a co-author, the resident gains first hand experience in the construction of a manuscript under the guidance of a Faculty Mentor.

IV. SPECIFIC COMPONENTS OF THE TRAINING PROGRAM

A. Nephrology Inpatient Consultation Service Curriculum

Educational Purpose

A. To have the residents acquire competence as a consultant in the evaluation and management of a wide spectrum of fluid and electrolyte disorders, kidney diseases, and hypertension.
B. To have the resident develop effective communication skills, both written and oral, that facilitates successful consultative interactions.

Rationale

The resident can best acquire the requisite knowledge, understanding, and experience necessary to acquire competence as a consultant in Nephrology by functioning as a junior or assistant consultant under the direct supervision of the Attending Nephrologist, and performing all components of the consultative process on inpatients referred for consultation, and receiving immediate feedback with constructive criticism from the Attending Nephrologist.

Teaching Method

Direct supervision: Direct supervision of the resident by the Attending Nephrologist during daily scheduled teaching rounds and during interactions to address emergent problems that arise in the course of the day or night constitutes the primary teaching method. The rotation on the consultation service is structured as follows:

1. Each resident rotates on the Consultation Service at Winthrop-University for a month at a time for a minimum of six months during the course of a two-year fellowship.
2. The resident is responsible for responding to all consultation requests during the assigned tour of duty. The promptness of the response to a consultation request is dictated by the urgency of the problem. In the vast majority of cases the consultation is completed on the same day the request is received. The resident is responsible for clarifying, as required, the purpose of the consultation or the question(s) that is to be addressed; gathering, organizing, and analyzing essential information from all available sources; and formulating a differential diagnosis along with recommendations for diagnostic and therapeutic interventions as appropriate to the issue being addressed. This information is recorded in writing on the Consultation Report which is placed in the patient's hospital chart after review and approval by the Nephrology Attending assigned to the Consultation Service. The resident is responsible also for recording progress notes that summarize the status of the patient's problem(s) along with additional recommendations as appropriate.
3. The Nephrology Attending, during daily teaching rounds, reviews in detail with the resident all patients seen in consultation that day. This activity includes discussion of the differential diagnosis, pathogenesis, pathophysiology, evaluation, treatment and prognosis of disorders presented by patients seen in consultation. Out of these discussions commonly arise questions that stimulate the resident to search the literature to find the answers. Subsequently, daily rounds shift to the bedside where the Nephrology Attending interviews and examines each patient seeking to corroborate key elements of the history and physical examination or to elicit additional information critical to establishing the diagnosis or guiding further diagnostic or therapeutic intervention. Selective review of the hospital chart, laboratory data and imaging studies is undertaken at this time as well. After further discussion the resident is provided the opportunity to modify, delete, or expand on his original assessment and recommendations, which with the approval of the Nephrology Attending are recorded in the chart and communicated to the referring physician or the appropriate resident. The Nephrology Attending is available

to the resident 24 hours a day to respond to emergency consultations or other urgent problems.

Tutorials: Supplementing the patient focused teaching summarized above are tutorial sessions during which the Nephrology Attending reviews with the resident assigned reading or generic clinical problems designed to expand the resident's understanding of a particular aspect of Nephrology such as disorders of fluid and electrolytes or acid-base balance.

Supervised Training in the Performance of Procedures: The Attending Nephrologist provides the resident with instruction and supervision with respect to the indications and performance of diagnostic and therapeutic procedures on patients seen in consultation. These include:

1. Percutaneous kidney biopsy.
2. Placement of percutaneous central and peripheral vein catheters as temporary access for hemodialysis.
3. Acute intermittent hemodialysis.
4. Continuous hemofiltration and hemodialysis.
5. Continuous cycler peritoneal dialysis.
6. Hemoperfusion for the treatment of certain intoxications.

Independent Study: The resident is encouraged to pursue independent study. This activity is facilitated by providing the resident ready access to the major textbooks and journals of nephrology and renal physiology which are maintained in the Division's conference room. In addition the resident has ready access to the books and journals housed in the Medical Library.

1. PATIENT CARE

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

Learning Objectives:

The 1st year nephrology fellow will learn to:

1. communicate with patients and their families in a caring and respectful manner on conditions relating to relevant medical issues and their kidney disease
2. obtain focused yet thorough and appropriate history and examination
3. extract essential and accurate information from the patient's chart and relevant medical records to formulate proper diagnostic and therapeutic plan
4. order suitable diagnostic (blood, urine, radiologic and tissue biopsy) tests and interpret the results correctly to reach the diagnosis.
5. utilize the most suitable dialytic therapy and provide appropriate dialysis prescriptions
6. understand the complications of and the appropriate treatments to deal with kidney related emergencies, including: hyperkalemia, hyponatremia, uremia, intoxications, and acute kidney injury.
7. estimate glomerular filtration rate and adjust medication doses accordingly
8. perform kidney biopsies, place temporary dialysis catheters, acute intermittent hemodialysis, continuous hemofiltration/hemodialysis, and continuous ambulatory peritoneal dialysis with appropriate faculty supervision

In addition, 2nd year nephrology fellow will learn to:

1. utilize the internet, PubMed and the appropriate valid information sources for patient management
2. provide formative and summative feedback to medical students, interns, and Junior Residents.
3. use up-to-date literature to critically examine the currently accepted diagnostic and therapeutic options

4. prescribe and monitor the favorable and adverse effects of medications used in nephrology including, but not limited to, immuno-suppressants, antibiotics, anti-hypertensives, and diuretics.

2. MEDICAL KNOWLEDGE

Goal: Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care.

Learning Objectives:

Please also see the detailed descriptions of each area of knowledge under section III.

General

The 1st year nephrology fellows will learn to:

1. interpret urinalysis findings of dipstick positive proteinuria
2. know the difference between microalbuminuria, macroalbuminuria, total urine protein and sulfosalicylic acid (SSA) precipitation test.
3. formulate a comprehensive differential diagnosis for acute kidney injury, chronic kidney disease, proteinuria, and hematuria
4. know the indications and the rationale for each diagnostic test used in acute kidney injury
5. interpret urine electrolyte findings in the context of electrolyte disorders, metabolic alkalosis, and acute kidney injury
4. estimate creatinine clearance by estimation formulas and know the limitations of such methods
5. calculate creatinine clearance and urea nitrogen clearance using a 24 hour urine collection and know the limitations of such methods
6. recognize life-threatening emergencies in nephrology

Intensive Care Unit Nephrology

The 1st and 2nd year nephrology fellows will learn to:

1. manage acute kidney injury associated with hemodynamic instability, nephrotoxins, sepsis, trauma, obstruction, hepatobiliary disease, cancer chemotherapy, and acute interstitial nephritis.
2. form a comprehensive differential diagnosis of acute renal failure and obtain theoretical and practical understanding of its pathogenesis, pathophysiology, evaluation, and management.
3. apply hemodynamic monitoring to guide therapy with intravenous fluids and vasoactive agents in the critically ill patient.
4. evaluate and manage fluid and electrolyte disorders and disturbances of acid-base balance commonly encountered in critically ill patients.
5. distinguish the indications, advantages and disadvantages of the different dialytic therapies in the management of renal failure in the critically ill patient.
6. utilize extracorporeal therapy in the management of drug overdose when appropriate.
7. provide adequate nutrition to the critically ill patient with renal failure.
8. take into account the effects of renal failure and dialytic therapy on drug pharmacokinetics and pharmacodynamics and the need for drug dose adjustments in these patients

Diabetes Mellitus and Diabetic Nephropathy:

The 1st and 2nd year nephrology fellows will learn to:

1. understand the various ways in which diabetes mellitus may affect the kidney and urinary tract
2. recognize the clinical manifestations and clinical course of renal disease associated with insulin and noninsulin dependent diabetes mellitus, and understand the pathophysiology underlying diabetic nephropathy.

3. apply therapeutic strategies for slowing progression of the disease process
4. apply the various dialytic modalities in the management of end stage renal disease in the diabetic patient.

Glomerular Diseases:
The 1st and 2nd year nephrology fellows will learn to:
1. identify the key clinical and laboratory features of acute glomerulonephritis, rapidly progressive glomerulonephritis, or nephrotic syndrome secondary to idiopathic glomerular disease or as a manifestation of a systemic disease process.
2. understand the clinical presentation, pathology, pathogenesis, diagnosis, treatment and prognosis of the various forms of glomerular disease.
3. know the indications, complications and interpretation of kidney biopsies.
4. perform kidney biopsies under the supervision of faculty

Chronic Renal Failure:
The 1st and 2nd year nephrology fellows will learn to:
1. distinguish between acute and chronic renal failure,
2. differentiate among vascular, glomerular and interstitial disease processes causing the chronic renal failure,
3. provide the conservative management of chronic renal failure during the predialytic period with particular emphasis on diet, control of hypertension, prevention of metabolic bone disease, treatment of anemia, and drug dose adjustments.
4. know the indications for establishing access and initiating dialysis therapy in patients with chronic renal failure.

Disorders of Divalent Cation. Mineral and Urate Metabolism:
The 1st and 2nd year nephrology fellows will learn to:
1. understand the pathogenesis and pathophysiology of acute hypo- and hypercalcemia, hypo- and hyperphosphatemia, hypo- and hypermagnesemia, and hyperuricemia.
2. evaluate and provide acute and long term management of these disorders.
3. understand the physiology of bone, Vitamin D and PTH metabolism and their management

Tubulo-Intersitial Disease and Urinary Tract Infection:
The 1st and 2nd year nephrology fellows will learn to:
1. recognize the presenting features of acute or chronic interstitial nephritis associated with drugs, urinary tract obstruction, reflux nephropathy, vascular disease, or analgesic nephropathy.
2. consider acute or chronic interstitial nephritis associated with drugs, urinary tract obstruction, reflux nephropathy, vascular disease, or analgesic nephropathy as a potential cause of renal failure of uncertain etiology.
3. identify the various causes of acute and chronic interstitial nephritis, their pathogenesis, pathophysiology, diagnostic evaluation, treatment, and prognosis.
4. know the pathogenesis, evaluation, and management of urosepsis.

Cystic Diseases of the Kidney:
The 1st and 2nd year nephrology fellows will learn to:
1. evaluate patients who are discovered during the course of an unrelated evaluation to have one or more cysts of the kidneys.
2. distinguish between multicystic disease and polycystic disease of the kidney
3. distinguish between simple cysts and complex cysts of the kidney
4. evaluate complex cysts.
5. know the complications related to autosomal dominant polycystic kidney disease.

Hypertension:
The 1st and 2nd year nephrology fellows will learn to:
1. manage malignant, accelerated, or resistant hypertension with or without renal failure.
2. manage life-threatening or severe hypertension
3. diagnose and manage the various forms of secondary hypertension
4. evaluate and manage resistant primary hypertension.
5. evaluate for renovascular hypertension and the various therapeutic options available to manage this disorder.

Renal Disease and Hypertension in Pregnancy:
The 1st and 2nd year nephrology fellows will learn to:
1. evaluate and manage patients who develop poorly controlled hypertension, acute renal failure, deterioration of chronic renal failure or acute disturbances in fluid, electrolyte, or acid-base balance during the course of their pregnancy or in the peripartum period.
2. understand the physiological changes in renal function, volume homeostasis, and blood pressure control during normal pregnancy
3. diagnose and manage hypertensive disorders of pregnancy
4. diagnose and manage renal disorders associated with pregnancy
5. recognize the impact of chronic hypertension and chronic renal disease on pregnancy, and how to manage such patients,
6. understand the impact of pregnancy on the underlying renal disease.

Fluid. Electrolyte. and Acid-Base Disorders:
The 1st and 2nd year nephrology fellows will learn to:
1. know the clinical impact of acute and chronic disorders of water, sodium, potassium and acid-base metabolism.
2. understand the normal physiology of water, sodium, potassium, and acid-base balance regulation
3. understand the pathophysiology of the various disorders giving rise to hypo- and hypernatremia, hypo- and hyperkalemia and acid-base disorders
4. diagnose and manage simple and mixed disorders of metabolic and respiratory acidosis and alkalosis

Modalities of Continuous Hemofiltration/Hemodialysis:
The 1st and 2nd year nephrology fellows will learn to:
1. understand the principles and practice of different forms of continuous hemofiltration, including continuous arterio-venous hemofiltration (CAVH), continuous venous-venous hemofiltration (CVVH), continuous arteriovenous hemofiltration/hemodialysis (CAVHD), and continuous venous-venous hemofiltration/hemodialysis (CVVHD).
2. prescribe continous hemofiltration/hemodialysis modalities

3. PRACTICE-BASED LEARNING AND IMPROVEMENT

Goal: Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.

Learning Objectives:
The 1st and 2nd year nephrology fellows will learn to:
1. identify the limits in one's knowledge through self-reflection
2. use information technology, e.g. Up-To-Date, to optimize learning and to fill in gaps in knowledge
3. set up realistic learning and improvement goals through the course of this fellowship
4. educate junior residents and medical students on fundamental concepts and knowledge in nephrology consultation

4. INTERPERSONAL AND COMMUNICATION SKILLS

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

Learning Objectives:

The 1st and 2nd year nephrology fellow will be able to

1. communicate the pertinent and critical components of a consult recommendation to the referring physicians, junior house staff and medical students.
2. write legible medical records with all pertinent information to facilitate management of the patients
3. present cases in a precise, accurate manner to the attending physician

5. PROFESSIONALISM

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

Learning Objectives:

The 1st and 2nd year nephrology fellow will be able to:

1. advocate for patient's welfare, needs and safety in the hospital setting
2. treat patients, physicians, nurses, ancillary staff and other health care personnel with compassion, integrity and respect at all times

6. SYSTEMS-BASED PRACTICE

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

Learning Objectives:

The 1st and 2nd year nephrology fellow will be able to

1. identify the benefits, risks and the economic implications of kidney biopsies
2. coordinate patient care with primary physicians and other subspecialists to improve care

Reading List

A Textbooks:
   1. Brenner and Rector, The Kidney
   2. *Schrier and Gottschalk, Diseases of the Kidney*
   3. Heptinstall, Pathology of the Kidney
   4. Laragh and Brenner, Hypertension
   5. Nissenson and Fine, Dialysis Therapies

B. Key Journals:
   1. Journal of the American Society of Nephrology (JASN)
   2. American Journal of Kidney Disease (AJKD)
   3. Kidney International (KI)
   4. Transplantation
   5. Hypertension

6. New England Journal of Medicine (NEJM)
7. Journal of Clinical Investigation (JCI)
8. American Journal of Physiology (Renal)

Conferences:

Please see conference section.

Evaluation:

During the rotation the resident receives concurrent feedback from the Attending. At the end the rotation the Attending completes a formal written evaluation of the resident which is submitted to the Program Director who maintains a permanent record of these evaluations. These evaluations are based on achieving the learning objectives and meeting the competency goal as outlined above.

The evaluation is reviewed directly by the attending with the trainee. At approximately four-monthly intervals the Program Director reviews these evaluations with the resident on a one on one meeting. Resident evaluation of both the Faculty and the Inpatient Consult Service Rotation is obtained on a monthly basis. The Program Director reviews the anonymous aggregate evaluation results and discusses the input with the Faculty for the purpose of ongoing Program and Faculty improvement.

Evaluation Methods used:

1. Direct observation of nephrology fellow by attending physicians.
2. Chart review
3. 360 Degree Evaluation from nurses and other health care personnel.
4. Feedback by attending physician at Journal Club, Clinical Conference, and presentation by fellows
5. Communication of patient and family satisfaction
6. Peer evaluation
7. Fellow's self-assessment
8. Mini-CEX

Please also see the Evaluation section in Section II.

B. Nephrology Inpatient ESRD Service & Surgical ICU Consult Curriculum

Educational Purpose

A. To have the resident acquire competence as a nephrologist caring for patients with ESRD admitted to the hospital because of intercurrent illnesses.
B. To have the resident develop effective communication skills, both written and oral, that facilitate successful peer interactions.
C. To have the residents acquire competence as a consultant in the evaluation and management of a wide spectrum of fluid and electrolyte disorders, kidney diseases, and hypertension in the surgical intensive care setting.

Rationale

The resident can best acquire the requisite knowledge, understanding, and experience necessary to acquire competence as a Nephrologist by under the direct supervision of the Attending Nephrologist, and performing all components of the care process on inpatients with ESRD.

Teaching Method

Direct supervision: Direct supervision of the resident by the Attending Nephrologist during daily scheduled teaching rounds and during interactions to address emergent problems that arise in the course of the day or night constitutes the primary teaching method. The rotation on the consultation service is structured as follows:

1. Each resident rotates on the Inpatient ESRD Service at Winthrop-University for a month at a time for a minimum of six months during the course of a two year fellowship.
2. The resident is responsible for evaluating the patient on a daily basis (or more frequently if clinically indicated). All pertinent problems should be outlined, with a plan of action formulated for each. It is the responsibility of the resident to document in the chart a daily note, notes to document any change in clinical status or procedures performed. Any significant change in clinical status must be communicated to the responsible attending as soon as possible.
3. The Nephrology Attending, during daily teaching rounds, reviews in detail with the resident all patients seen that day. This activity includes discussion of the differential diagnosis, pathogenesis, pathophysiology, evaluation, treatment and prognosis of disorders presented by patients. Out of these discussions commonly arise questions that stimulate the resident to search the literature to find the answers. Subsequently, daily rounds shift to the bedside where the Nephrology Attending interviews and examines each patient seeking to corroborate key elements of the history and physical examination or to elicit additional information critical to establishing the diagnosis or guiding further diagnostic or therapeutic intervention. Selective review of the hospital chart, laboratory data and imaging studies is undertaken at this time as well. The Nephrology Attending is available to the resident 24 hours a day to respond to emergency consultations or other urgent problems.

Tutorials: Supplementing the patient focused teaching summarized above are tutorial sessions during which the Nephrology Attending reviews with the resident assigned reading or generic clinical problems designed to expand the resident's understanding of a particular aspect of Nephrology.

Supervised Training in the Performance of Procedures: The Attending Nephrologist provides the resident with instruction and supervision with respect to the indications and performance of diagnostic and therapeutic procedures on patients seen in consultation. These include:

1. Percutaneous kidney biopsy
2. Placement of percutaneous central and peripheral vein catheters as temporary access for hemodialysis.

3. Acute intermittent hemodialysis.
4. Continuous hemofiltration and hemodialysis.
5. Continuous ambulatory peritoneal dialysis.

Independent Study: The resident is encouraged to pursue independent study. This activity is facilitated by providing the resident ready access to the major textbooks and journals of nephrology and renal physiology which are maintained in the Division's conference room. In addition the resident has ready access to the books and journals housed in the Medical Library.

1. PATIENT CARE

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

Learning Objectives:

The 1st year nephrology fellow will learn to:

1. communicate with patients and their families in a caring and respectful manner on conditions relating to dialysis and its complications
2. provide clear and safe hand-off information to other nephrologists, dialysis nurses and other health care professionals.
3. obtain focused yet thorough and appropriate history and examination
4. extract essential and accurate information from the patient's chart and relevant medical records to formulate proper diagnostic and therapeutic plan
5. order suitable diagnostic (blood, urine, radiologic and tissue biopsy) tests and interpret the results correctly to reach the diagnosis.
6. utilize the most suitable hemodialysis and peritoneal dialysis therapy and provide appropriate dialysis prescriptions
7. adjust medication doses in end-stage renal disease patients, accounting for the remaining amount of renal residual function
8. perform kidney biopsies, place temporary dialysis catheters, acute intermittent hemodialysis, continuous hemofiltration/hemodialysis, and continuous ambulatory peritoneal dialysis with appropriate faculty supervision
9. manage the common complications encountered in dialysis patients including: hyperkalemia, volume overload, uremic pericarditis, intoxications, hypotension, access related infections, access related bleeding, and PD peritonitis.

In addition, 2nd year nephrology fellow will learn to:

1. evaluate dialysis fistula for evidence of stenosis at venous anastamosis, excessive collateral blood flow, recirculation and central venous stenosis.
2. utilize the internet, PubMed and the appropriate valid information sources for patient management
3. use up-to-date literature to critically examine the currently accepted diagnostic and therapeutic options

2. MEDICAL KNOWLEDGE

Goal: Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care.

Learning Objectives:

Inpatient Care of ESRD Patients: Throughout the nephrologists' career, an important component of activity is in treating the intercurrent illnesses experienced by ESRD patients. The resident builds on the knowledge developed in his/her internal medicine training by learning about the additional burden placed on disease states by the presence of ESRD, the attendant demands of dialysis and the adjustments necessary to the dialysis regimen due to the presence of intercurrent illness.

The 1st year nephrology fellow will learn to:

1. understand the advantages and disadvantages of available hemodialyzers with emphasis on differences in membrane composition, biocompatibility, and solute and water flux.
2. understand the principles and factors which regulate/affect hemodialysis and peritoneal dialysis treatments
3. understand the steps required to monitor the actual delivered dose of hemodialysis and peritoneal dialysis
4. understand the clinical features, mechanisms and therapy for the most common complication of hemodialysis, including hypotension, cramps, arrhythmias, hemolysis, dialysis access malfunction, dialysis access infection and air embolism.
5. understand the clinical features, mechanisms and therapy for most common complications of peritoneal dialysis, including peritonitis, hypotension, hernias, dialysate leaks, and inadequate dialysis
6. understand the mechanisms and indications for each form of continuous dialytic therapies, including continuous arteriovenous hemodiafiltration and continuous venovenous hemodiafiltration, and the available forms of anticoagulation, including heparin and local citrate infusion.

In addition to above, the 2nd year nephrology fellow will learn to:

1. understand the nutritional consideration and management of ESRD patients in the setting of acute illness, including the concept of protein catabolism rate, prealbumin and albumin
2. understand the principles of pharmacokinetics which affect the use of drugs and its dosage in dialysis patients
3. know the mechanisms, management plan and preventive plans associated with dialysis access malfunction, including thrombosis, stenosis, leaks and infections.
4. know the impact of cardiovascular disease on mortality and morbidity of dialysis patients.

Surgical Intensive Care Unit Nephrology:

The 1st and 2nd year nephrology fellows will learn to:

1. manage acute kidney injury associated with hemodynamic instability, nephrotoxins, sepsis, trauma, obstruction, hepatobiliary disease, cancer chemotherapy, and acute interstitial nephritis.
2. form a comprehensive differential diagnosis of acute renal failure and obtain theoretical and practical understanding of its pathogenesis, pathophysiology, evaluation, and management.
3. apply hemodynamic monitoring to guide therapy with intravenous fluids and vasoactive agents in the critically ill patient.
4. evaluate and manage fluid and electrolyte disorders and disturbances of acid-base balance commonly encountered in critically ill patients.

5. distinguish the indications, advantages and disadvantages of the different dialytic therapies in the management of renal failure in the critically ill patient.
6. utilize extracorporeal therapy in the management of drug overdose when appropriate.
7. provide adequate nutrition to the critically ill patient with renal failure.
8. adjust the medications accounting for the effects of renal failure and dialytic therapy on drug pharmacokinetics

3. PRACTICE-BASED LEARNING AND IMPROVEMENT

Goal: Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.

Learning Objectives:

The 1st and 2nd year nephrology fellows will learn to:

1. search and critically analyze recent journal articles which impact the understanding of dialytic modalities, e.g. studies on dialysis adequacy and cardiovascular mortality/morbidity
2. facilitate the learning of relevant dialysis-related issues by referring primary care physicians, subspecialty physicians and other health care personnel.
3. set up realistic learning and improvement goals through the course of this fellowship

4. INTERPERSONAL AND COMMUNICATION SKILLS

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

Learning Objectives:

The 1st and 2nd year nephrology fellows will learn to:

1. keep an open and honest therapeutic relationship with patients to facilitate an informed decision making process
2. use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills

5. PROFESSIONALISM

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

Learning Objectives:

The 1st and 2nd year nephrology fellows will learn to:

1. advocate for patient's welfare, needs and safety in the hospital setting
2. treat patients, physicians, nurses, ancillary staff and other health care personnel with compassion, integrity and respect at all times
3. demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities

6. SYSTEMS-BASED PRACTICE

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

Learning Objectives:

The 1st and 2nd year nephrology fellow will learn to

1. identify the medical, social and economic implications of dialysis

2. advocate for quality patient care and assist patients in dealing with system complexities of dialysis and insurance systems.
3. coordinate general patient care and dialysis treatments with primary physicians to improve care

Reading List

A. Textbooks:

1. Brenner and Rector, The Kidney
2. Schrier and Gottschalk, Diseases of the Kidney
3. Heptinstall, Pathology of the Kidney
4. Laragh and Brenner, Hypertension
5. Danovitch, Renal Transplantation
6. Nissenson and Fine, Dialysis Therapies

B. Key Journals:

1. Journal of the American Society of Nephrology (JASN)
2. American Journal of Kidney Disease (AJKD)
3. Kidney International (KI)
4. Transplantation
5. Hypertension
6. New England Journal of Medicine (NEJM)
7. Journal of Clinical Investigation (JCI)
8. American Journal of Physiology (Renal)
9. Seminars in Dialysis
10. Advances in Renal Replacement Therapy

Conferences:

Please see conference section.

Evaluation:

During the rotation the resident receives concurrent feedback from the Attending. At the end the rotation the Attending completes a formal written evaluation of the resident which is submitted to the Program Director who maintains a permanent record of these evaluations. These evaluations are based on achieving the learning objectives and meeting the competency goal as outlined above.

The evaluation is reviewed directly by the attending with the trainee. At approximately four-monthly intervals the Program Director reviews these evaluations with the resident on a one on one meeting. Resident evaluation of both the Faculty and the Inpatient Consult Service Rotation is obtained on a monthly basis. The Program Director reviews the anonymous aggregate evaluation results and discusses the input with the Faculty for the purpose of ongoing Program and Faculty improvement.

Evaluation Methods used:

1. Direct observation of nephrology fellow by attending physicians.
2. Chart review
3. 360 Degree Evaluation from nurses and other health care personnel.
4. Feedback by attending physician at Journal Club, Clinical Conference, and presentation by fellows
5. Communication of patient and family satisfaction
6. Peer evaluation
7. Fellow's self-assessment

Please also see the Evaluation section in Section II.

C. Nephrology Ambulatory Care Curriculum

Educational Purpose

A. To have the resident acquire competence as a consultant in the evaluation and management of a wide spectrum of kidney diseases$_1$ hypertension and renal replacement modalities in an ambulatory setting with an emphasis on continuity of care over a 2 year period.
B. To have the resident develop effective communication skills$_1$ both written and oral$_1$ with an emphasis on subspecialty consultation, follow-up and co-ordination of care with primary care physicians and other care providers.

Rationale

The major component of the resident's practice upon completion of training is most likely to take place in the office setting. The rationale behind the ambulatory experience is to provide the resident with an experience whereby he/she will learn how to manage the diverse clinical conditions encountered in a Nephrology and Hypertension office practice. The resident will gain an understanding of the underlying pathophysiology by actively participating in the care of patients and observing the evolution of the clinical course of the disease under the close supervision of an Attending Nephrologist. This setting will also afford the resident the opportunity to gain experience as how and when to intervene in terms of the various modalities of renal replacement therapy that are available. A large number of patients who have functioning renal allografts are followed in the ambulatory program. This serves as an important venue for the resident to gain experience in caring for the post-transplant patient.

Teaching Method

Direct supervision: Direct supervision of the resident by the Attending Nephrologist during Kidney Care Center constitutes the primary teaching method. The resident is assigned to one Attending Nephrologist per year. The resident attends one half day outpatient session per week. The resident sees new consults, and follows his/her existing patients under the supervision of the Attending Nephrologist. The resident is responsible for gathering all information relevant to the case at hand, examining the patient, obtaining information on ancillary tests performed to date and organizing the data into a coherent differential diagnosis along with diagnostic and therapeutic recommendations. The resident reviews all of these aspects with the Attending Nephrologist. Importantly, fresh urine specimens are examined by the resident and the observations verified by the Attending Nephrologist. Imaging studies are viewed and discussed with a Radiologist. This methodology carries over to follow up visits by each patient. Continuity of care is emphasized. In this manner the resident also learns to establish a rapport with the patient on an ongoing basis.

Independent Study: The resident is encouraged to pursue independent study on cases seen in the ambulatory setting through textbooks and journals as elaborated in the previous section. A set of slides encompassing key findings in the urinary sediment are also available to the residents for self-instruction.

Setting

The Division of Nephrology and Hypertension is located at 200 Old Country Rd, suite 135, Mineola, NY 11501.

1. PATIENT CARE

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

Learning Objectives:
The 1st and 2nd year nephrology fellows will learn to:

1. communicate with patients and their families in a caring and respectful manner on conditions relating to relevant medical issues and their kidney disease
2. provide clear communication and feedback to referring physicians and other subspecialists involved to improve the patient's care
3. obtain a thorough and appropriate initial history and perform a full physical examination with special attention to (a) accurate measurement of blood pressure, (b) evaluation of retinal fields, (c) cardiovascular examination, (d) detection of sacral and pedal edema, and (e) examination of the peripheral vasculature.
4. extract essential and accurate information from the patient's chart and relevant medical records to formulate proper diagnostic and therapeutic plan
5. obtain diagnostic tests in a manner that is effective and efficient. Such tests include but are not limited to: (a) urine culture, (b) urine collection for protein and creatinine clearance quantitation, (c) urine collection for calcium, oxalate, uric acid and citrate quantitation, (d) blood chemistries, (e) twenty four hour blood pressure monitoring, (f) radiological imaging including intravenous pyelography (IVP), ultrasonography, isotope scans, CT scans, MRI and angiography, (g) microalbuminuria, (h) assessment of renal acidification, (i) concentration and dilution capacity, (j) assessment urinary sodium and potassium excretion, and (k) assessment of the activity of the renin-angiotensin-aldosterone system
6. estimate glomerular filtration rate and adjust medication doses accordingly
7. perform kidney biopsies with appropriate faculty supervision
8. use internet, PubMed and the appropriate up-to-date valid literature data to critically examine the currently accepted diagnostic and therapeutic options
9. be familiar with a wide array of therapeutic interventions. Such interventions include but are not limited to (a) selection of anti-hypertension medications and management of hypertension, (b) selection and use of diuretics, (c) management modalities of diabetic nephropathy, (d) selection and management of immunosuppressive agents in renal transplant recipients, (e) management of nephrolithiasis, (f) therapy modalities available for idiopathic glomerulopathies, and (g) selection of antibiotics for common urinary tract infections
10. prescribe and monitor the favorable and adverse effects of medications used in nephrology including, but not limited to, immuno-suppressants, antibiotics, anti-hypertensives, and diuretics.
11. provide health care services aimed at preventing health problems or maintaining health work with health care professionals, including those from other disciplines, to provide patient-focused care

2. MEDICAL KNOWLEDGE

Goal: Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care.

Learning Objectives:
The 1st and 2nd year nephrology fellows will learn to:

1. understand the pathophysiology, diagnostic methods, criteria and therapeutic options for chronic kidney diseases, including but not limited to: nephrotic syndrome, sub-nephrotic proteinuria nephritis, diabetic nephropathy, interstitial disease, obstructive uropathy
2. understand the causes and diagnostic maneuvers to differentiate hematuria from glomerular diseases and non-glomerular diseases
3. know the definition of and the full evaluation method for anuria, urinary frequency, urinary urgency, polyuria, polydipsia, and nocturia

4. know the mechanisms, pathophysiology, diagnostic rationale and treatment options for primary hypertension and secondary hypertension in various age groups
5. know the various underlying forms of nephrolithiasis (e.g. calcium oxalate, urate, calcium phosphate, etc.) and the corresponding radiological, biochemical, anatomical evaluation methods, and strategies to reduce the recurrence of respective stones.
6. know the various forms of cystic kidney disease, including their clinical presentation, cyst features and impact on kidney function and other multi-system organs.
7. know the various inheritable causes of familial kidney diseases, including the mechanisms, genetic pattern, diagnostic options and the impact on the kidneys and other multi-system organs.
8. know the impact of systemic illnesses which can affect the kidneys
9. know the multi-system manifestations of chronic kidney failure and uremia
10. know the differences between various dialysis modalities and indications, benefits and limitations of advanced access placement
11. understand the physiologic mechanisms, work-up, and treatment of various causes of edema from renal, cardiac, gastrointestinal, and hepatic causes.
12. know the impact of aging on kidney function, blood pressure, medication side-effects, medication-affordability, cognitive abilities, and atherosclerotic disease.
13. know the impact of chronic kidney disease on nutritional status, and conversely, the impact of nutrition on kidney disease progression
14. know the benefits and the limitations/side-effects of angiotensin converting enzyme inhibitors (ACE-i) and angiotension receptor blockers (ARBs) on various forms of kidney disease, as well as their effects on the developing fetus
15. know the organisms responsible, clinical features, diagnostic measures and therapeutic options for simple lower UTI's as well as pyelonephritis in healthy individuals, kidney transplant recipients and patients with nephrolithiasis.
16. know the effect of reduced kidney function on medications dosing and side-effects
17. know the mechanisms, dosing, indications and the therapy complications of immune modulating medications used in kidney transplantation

3. PRACTICE-BASED LEARNING AND IMPROVEMENT

Goal: Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.

Learning Objectives:

The 1st and 2nd year nephrology fellows will learn to:

1. search and critically analyze recent and classic journal articles which impact the understanding of ambulatory patient care, including but not limited to hypertension, glomerulopathy, polycystic kidney disease, nephrolithiasis and chronic kidney disease.
2. facilitate the learning of relevant chronic kidney disease related issues by referring primary care physicians.
3. perform practice-based improvement activities on their office patients under the guidance of a faculty

4. INTERPERSONAL AND COMMUNICATION SKILLS

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

Learning Objectives:

The 1st and 2nd year nephrology fellows will learn to:

1. keep an open and honest therapeutic relationship with patients in discussing the progression of their kidney disease

2. use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills to ensure that (a) physician's recommendations, disease process, disease prognosis, diagnostic options, and therapeutic options are clearly understood by the patients, (b) the patient's concerns and wishes are carefully elicited from the patients.

5. PROFESSIONALISM

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

Learning Objectives:

The 1st and 2nd year nephrology fellows will learn to:

1. advocate for patient's welfare, needs and safety in the ambulatory setting.
2. demonstrate a commitment to ethical principles pertaining to provision or withholding of clinical care, confidentiality of patient information, informed consent, and business practices.
3. demonstrate sensitivity and responsiveness to patients' culture, age, gender, and disabilities.

6. SYSTEMS-BASED PRACTICE

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

Learning Objectives:

The 1st and 2nd year nephrology fellow will learn to

1. identify the medical, social and economic implications of kidney disease
2. advocate for quality patient care and assist patients in dealing with system complexities of (a) insurance-related medication cost containment and regulation of diagnostic test access and (b) lack of insurance coverage.
3. coordinate general patient care and dialysis treatments with primary physicians to improve care
4. practice cost-effective health care and resource allocation without compromising quality of care.

Reading List

A. Textbooks:
   1. Brenner and Rector, The Kidney
   2. Schrier and Gottschalk, Diseases of the Kidney
   3. Heptinstall, Pathology of the Kidney
   4. Laragh and Brenner, Hypertension
   5. Danovitch, Renal Transplantation

B. Key Journals:
   1. Journal of the American Society of Nephrology (JASN)
   2. American Journal of Kidney Disease (AIKO)
   3. Kidney International (KI)
   4. Transplantation
   5. Hypertension
   6. New England Journal of Medicine (NEJM)

Evaluation:

During the rotation the resident receives concurrent feedback from the Attending. Every 4 months, Faculty will complete a formal written evaluation of the resident on their performance during their ambulatory care clinic. The evaluations are submitted to the Program Director who maintains a permanent record of these evaluations. These evaluations are based on achieving the learning objectives and meeting the competency goal as outlined above.

The evaluation is reviewed directly by the attending with the trainee. At approximately four-monthly intervals the Program Director reviews these evaluations with the resident on a one on one meeting. Resident evaluation of both the Faculty and the Inpatient Consult Service Rotation is obtained on a monthly basis. Ambulatory continuity clinic evaluation is obtained on a 4 month basis. The Program Director reviews the anonymous aggregate evaluation results and discusses the input with the Faculty for the purpose of ongoing Program and Faculty improvement.

Evaluation Methods used:

1. Direct observation of nephrology fellow by attending physicians.
2. Chart review
3. 360 Degree Evaluation from nurses and other health care personnel.
4. Feedback by attending physician at Journal Club, Clinical Conference, and presentation by fellows
5. Written patient surveys
6. Peer evaluation
7. Fellow's self-assessment
8. Mini-CEX

Please also see the Evaluation section in Section II.

D. Outpatient Dialysis Curriculum

Educational Purpose
A. To afford the resident the opportunity to acquire competence in the array of dialytic therapies available both for home and ambulatory care.
B. To provide the resident with a setting whereby the evolution of disease processes associated with chronic dialysis can be longitudinally followed over the course of time by emphasizing continuity of care.

Rationale
Chronic dialysis constitutes an important aspect of care provided by the Nephrologist in practice. The rationale behind the dialysis rotation is to ensure that the resident gains experience with, and an understanding of the clinical aspects of chronic dialysis by caring for patients with end stage renal disease (ESRD) under the supervision of the Attending Nephrologist. The resident will also acquire skills and gain experience in techniques and procedures used in dialysis.

TEACHING METHODS
Direct supervision: Direct supervision of the resident by the Attending Nephrologist during daily scheduled teaching rounds on hemodialysis patients, during weekly patient care conferences, and monthly collaborative practice meetings constitutes the primary teaching method. Each resident rotates on the dialysis unit at Winthrop-University Hospital (200 Old Country Road, Mineola, NY) for a month at a time and for a minimum of five months during the fellowship. The resident is responsible for interacting with the patient at the dialysis session, recording any untoward events, evaluating monthly blood results and summarizing the course of the month in the patient's chart after a detailed discussion with the Attending Nephrologist. In addition, the resident works with the peritoneal dialysis nurses, the renal dieticians and social workers and attends CQI Committee meetings.

Independent Study: The resident is encouraged to pursue independent study on aspects of dialysis that pertain to the patients under his care through textbooks and journals as elaborated in a previous section.

Setting
Winthrop-University Hospital Dialysis Center at Mineola
Peritoneal Dialysis Unit and Hemodialysis Unit
35 stations hemodialysis, 280 active dialysis patients

1. PATIENT CARE
Goals: Residents must be able to provide patient care that is compassionate, appropriate, and effective for the treatment of health problems and the promotion of health.

Learning Objectives:
The 1st and 2nd year nephrology fellows will learn to:
1. communicate with patients and their families in a caring and respectful manner on conditions relating to dialysis, its complications and prognosis
2. order suitable diagnostic (blood, urine, radiologic and tissue biopsy) tests and interpret the results correctly to reach the diagnosis.
3. manage the common complications encountered in chronic dialysis patients including: hyperkalemia, volume overload, hypertension, fevers at dialysis, access infections and failures and PD peritonitis.
4. evaluate hemodialysis access venous pressure, fistula for evidence of stenosis at venous anastamosis, excessive collateral blood flow, recirculation and central venous stenosis.

5. assess and manage (a) adequacy of dialysis, (b) blood pressure and estimated dry weight, (c) calcium/phosphorus/vitamin D/PTH related issues, (d) anemia, (e) potassium, (f) acid-base balance, (e) nutrition and (f) transplant evaluation referrals.

6. utilize the internet, PubMed, up-to-date literature and the appropriate valid information sources for patient management and to critically examine the currently accepted diagnostic and therapeutic options

2. MEDICAL KNOWLEDGE

Goal: Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care.

Learning Objectives:

Hemodialysis (HD):

The 1st and 2nd year nephrology fellows will learn to:

1. know the indications for HD
2. understand the physiologic principles and machine mechanisms involved with HD apparatuses including the effects of dialyzer filter reuse
3. understand the water treatment processes required in HD
4. understand the benefits, similarities/differences and limitations among various types of vascular accesses
5. understand the rationale behind HD prescription, including but not limited to hemodialysis filter selection, access blood flow, dialysate blood flow, anticoagulation, vitamin D, erythropoietin, estimated dry weight, sodium modeling, ultrafiltration profile
7. understand the indications, contraindications, dosing guidelines and complications of anticoagulation in HD
8. understand the pathophysiology of complications encountered during HD
9. understand the principles behind drug dose modification in patients on HD

Peritoneal Dialysis (PD):

The 1st and 2nd year nephrology fellows will learn to:

1. know the indications and various forms of PD, including differences and similarities between CAPD, CCPD and NIPD
2. understand the physiologic principles, mechanisms and apparatuses involved with PD
3. understand the process of PD access placement and possible complications
4. understand the rationale and physiology of urea and larger molecular transport, as well the effect of various dwell times on ultrafiltration and solute kinetics.
5. know the variables which affect PD prescription
6. know the concept underlying PET (peritoneal solute and water transport) and factors affecting PET
7. know the complications encountered during PD including peritonitis and exit site infection
8. understand the pharmacokinetics of medications in patients on PD, drug dose modification in patients on PD and the effect of residual renal function in PD patients.

Longitudinal Care: ESRD patients encounter a number of medical and surgical problems that have particular bearing upon chronic dialysis therapy.

The 1st and 2nd year nephrology fellows will learn to:

1. understand the psychological and rehabilitation issues encountered in dialysis patients
2. understand the nutrition requirements of ESRD patients
3. understand the pathophysiology of bone disease

4. know the history, pathology and potential toxicity of aluminum-based phosphate binders and aluminum water contamination in dialysis patients
5. know the management issues relevant to hypertension control and its complications
6. know the management issues of diabetes mellitus and its complications in dialysis patients, including the effect of medication/insulin clearance
7. understand the issues relevant to preparation for surgical procedures, e.g. cardiac risk factors in dialysis patients, effect of dialysis related anticoagulation, uremic platelet dysfunction, glycemic control, peri-operative antibiotic dosing
8. understand the factors contributing to anemia and the role of iron deficiency, erythropoietin dosing, benefits and risks.

3. PRACTICE-BASED LEARNING AND IMPROVEMENT

Goal: Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.

Learning Objectives:

The 1st and 2nd year nephrology fellows will learn to:

1. search and critically analyze recent and classic journal articles on hemodialysis and peritoneal dialysis which impact the understanding of chronic dialysis patient care, including but not limited to adequacy of dialysis, hypertension, anemia, cardiovascular disease, bone metabolism, dialysis access and infections.
2. facilitate the learning of relevant issues in chronic dialysis patients by other physicians involved in the patient's care.

4. INTERPERSONAL AND COMMUNICATION SKILLS

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

Learning Objectives:

The 1st and 2nd year nephrology fellows will learn to:

1. keep an open and honest therapeutic relationship with patients in discussing the goals of continued dialysis, need for attentive patient participation with fluid and nutrition compliance, and goals of overall medical care.
2. use effective listening skills and elicit and provide information using effective nonverbal, explanatory, questioning, and writing skills to ensure that (a) physician's recommendations, disease process, disease prognosis, diagnostic options, and therapeutic options are clearly understood by the patients, (b) the patient's concerns and wishes are carefully elicited from the patients.
3. ensure that patient's social, nutritional and emotional needs are effectively conveyed to the physicians and other key dialysis staff, including dietitians, social workers and nurses.
4. ensure that patient's comfort and pain needs are effectively conveyed to the physicians and other key dialysis staff, including social workers and nurses.

5. PROFESSIONALISM

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

Learning Objectives:

The 1st and 2nd year nephrology fellows will learn to:

1. advocate for patient's welfare, needs and safety in the ambulatory dialysis setting.
2. demonstrate a commitment to ethical principles pertaining to provision or withholding of dialysis with patient's goals, wishes and understanding as a major focus of healthcare.

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

6. SYSTEMS-BASED PRACTICE

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

Learning Objectives:

The 1st and 2nd year nephrology fellow will learn to

1. identify the medical, social and economic implications of chronic dialysis
2. advocate for quality patient care and assist patients in dealing with system complexities of (a) insurance-related medication cost containment and regulation of diagnostic test access and (b) lack of insurance coverage.
3. coordinate general patient care and dialysis treatments with primary physicians to improve care
4. practice cost-effective health care and resource allocation without compromising quality of care.

Reading List

A. Textbooks:
   1. Nissenson and Fine: Dialysis Therapies
   2. Daugridas and Ing: Handbook of Dialysis
   3. Maher: Replacement of Renal Function by Dialysis.
   4. Nolph: Peritoneal Dialysis

B. Key Journals:
   1. Journal of the American Society of Nephrology (JASN)
   2. American Jou'rnal of Kidney Disease (AJKD)
   3. Kidney International (KI)

Additional Rotation Specific Conferences:

1. Weekly Patient Care Conferences
2. Monthly Collaborative Practice Meetings

Evaluation:

During the rotation the resident receives concurrent feedback from the Attending. At the end the rotation the Attending completes a formal written evaluation of the resident which is submitted to the Program Director who maintains a permanent record of these evaluations. These evaluations are based on achieving the learning objectives and meeting the competency goal as outlined above.

The evaluation is reviewed directly by the attending with the trainee. At approximately four-monthly intervals the Program Director reviews these evaluations with the resident on a one on one meeting. Resident evaluation of both the Faculty and the Inpatient Consult Service Rotation is obtained on a monthly basis. The Program Director reviews the anonymous aggregate evaluation results and discusses the input with the Faculty for the purpose of ongoing Program and Faculty improvement.

Evaluation Methods used:

1. Direct observation of nephrology fellow by attending physicians.

2. Chart review
3. 360 Degree Evaluation from nurses and other health care personnel.
4. Feedback by attending physician at Journal Club, Clinical Conference, and presentation by fellows
5. Communication of patient and family satisfaction
6. Peer evaluation
7. Fellow's self-assessment

Please also see the Evaluation section in Section II.

E. Transplantation Services Curriculum

Educational Purpose

A. To have the resident acquire competence in the management and evaluation of patients who have undergone renal transplantation, and to acquire proficiency in the various modalities of immunosuppressive therapy. The curriculum includes both pre-transplantation evaluation and post-transplantation monitoring in the inpatient and outpatient settings.

B. To provide the resident with a setting whereby the outcome of renal transplantation can be effectively monitored and where complications can be managed under the supervision of an Attending Nephrologist.

Rationale

Renal transplantation is a widely accepted modality of renal replacement therapy for individuals with end stage renal disease. The practicing Nephrologist is frequently called upon to manage patients who have undergone renal transplantation. The rationale behind this rotation is to provide the resident with practical exposure to the various aspects of renal transplantation by managing renal transplantation recipients during their initial hospitalization and subsequent outpatient course under the supervision of the Attending Nephrologist

Teaching methods

Direct supervision: Direct supervision of the resident by the Attending Nephrologist during daily scheduled teaching rounds on the inpatient service or during office hours on the outpatient service constitutes the primary teaching method. Each resident rotates on the Transplantation Inpatient Service at Columbia University College of Physicians and Surgeons two months during the course of a two year fellowship.

All prospective renal transplant recipients admitted to the Renal Transplantation Inpatient Service are seen in consultation by the Nephrology Service to ensure that they are medically stable and optimally prepared for surgery. Furthermore, these patients are followed throughout the post-transplant period until the patients are medically stable for discharge. The Nephrology Inpatient Consultation Service also evaluates all patients readmitted to the Renal Transplantation Service for medical or surgical complications. Daily scheduled teaching rounds are carried out in unison with the surgical transplantation team; never-the-less direct supervision of the Nephrology resident is the responsibility of the Attending Nephrologist who has expertise in transplantation. From these encounters the resident learns about the principles of basic immunology, tissue typing, and the pharmacology and toxicology of immunosuppressive agents. The resident also encounters the postoperative management of the transplant recipient, the causes, pathogenesis, evaluation and treatment of early and late graft dysfunction, infectious complications, metabolic and endocrine dysfunction, and hypertension.

This inpatient experience is supplemented by an outpatient experience in the renal transplant clinic where the trainee learns about the course and long-term management of renal transplant recipients and the complications related to long-term immunosuppression. In addition, the trainee learns about the pretransplant evaluation of prospective transplant recipients and living related and emotionally related donors. In the ambulatory setting supervision is provided jointly by the Attending Nephrologist and the Transplant $Surgeon_1$ both of whom have expertise in renal transplantation and the management of immunosuppressive therapy.

Setting

Columbia University College of Physicians and Surgeons

1. PATIENT CARE

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

Learning Objectives:
The 2nd year nephrology fellow will learn to:
1. communicate with patients and their families in a caring and respectful manner on issues relating to pre-transplant evaluation process, transplant surgery, and post-transplant care.
2. manage transplant related medications, including immuno-suppressants and antibiotic prophylaxis against opportunistic infections
3. manage the complications seen with kidney transplant, including hyperacute rejection, acute rejection, chronic rejection, urinary tract obstruction, transplant arterial thrombosis, glomerular disease recurrence and delayed graft function.
4. manage the complications of immunosuppressant medications including microangiopathic hemolytic anemia from calcineurin inhibitors, chronic interstitial fibrosis, lymphoproliferative disorders, malignancy risk, glucose metabolism impairment and hypertension
5. perform transplant kidney biopsies with appropriate faculty supervision
6. utilize the internet, PubMed and the appropriate valid information sources for up-to-date patient management to understand and critically examine the currently accepted diagnostic and therapeutic options
7. adjust and account for multi-drug interactions often seen with immunosuppressant medications, e.g. interaction of calcineurin inhibitors with macrolides, antifungal medications, grapefruit juice, etc.
8. adjust immunosuppressive medications to therapeutic levels by time from transplant and complications encountered.

2. MEDICAL KNOWLEDGE
Goal: Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care.

Learning Objectives:
The 2nd year nephrology fellow will learn to:
1. understand the mechanisms, physiology and pharmacology of transplantation immunology and immunosuppressive agents
2. know the mechanism of and immunosuppressive drug interaction
3. understand the key components of and rationale behind pretransplant evaluation of the recipient
4. understand the key factors which can delay the pretransplant evaluation and proceeding of transplantation, e.g. compliance, insurance issues, PRA, etc.
5. understand the key components of postoperative management of the recipient
6. understand the rationale of diagnostic and therapeutic steps involved with acute allograft rejection
7. understand the rationale of diagnostic and therapeutic steps involved in management of the nonfunctioning transplanted kidney
8. know the urological and vascular complications of renal transplantation
9. understand the intricacies of diagnosis and management of drug toxicity in recipients
10. understand the infectious complications following renal transplantation
11. understand the etiology, diagnosis and treatment of hypertensive complications following transplantation.
12. understand the evaluation, diagnosis and management of the long term complications of renal transplantation, including (a) chronic rejection, (b) post-transplant erythrocytosis, (c)

hyperlipidemia, (d) bone disease complicating renal transplantation, (e) gout, (f) recurrence of primary disease, (g) lymphoproliferative disease and (h) cancers.

3. PRACTICE-BASED LEARNING AND IMPROVEMENT

Goal: Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.

Learning Objectives:

The 2nd year nephrology fellows will learn to:

1. use information technology, e.g. Up-To-Date, to optimize learning and to fill in gaps in knowledge
2. educate junior residents and medical students on critical concepts and knowledge in transplant nephrology

4. INTERPERSONAL AND COMMUNICATION SKILLS

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

Learning Objectives:

The 2nd year nephrology fellow will be able to

1. communicate the pertinent and critical components of the transplant patient management to the other physicians, junior house staff and medical students.
2. write legible medical records with all pertinent information to facilitate management of the complex kidney transplant patients

5. PROFESSIONALISM

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

Learning Objectives:

The 2nd year nephrology fellow will be able to:

1. advocate for patient's welfare, needs and safety in the hospital setting
2. treat patients, physicians, nurses, ancillary staff and other health care personnel with compassion, integrity and respect at all times

6. SYSTEMS-BASED PRACTICE

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

Learning Objectives:

The 2nd year nephrology fellow will be able to

1. identify the benefits, risks and the economic implications of kidney transplantation
2. coordinate patient care with involved physicians and other health care personnel to improve care

Reading List

A. Textbooks:
   1. Danovitch, Handbook of Kidney Transplantation
   2. Morris, Transplantation

B. Key Journals:
   1. Transplantation
   2. Transplantation Proceedings
   3. Clinical Transplantation

Evaluation

During the rotation the resident receives concurrent feedback from the Attending. At the end the rotation the Attending completes a formal written evaluation of the resident which is submitted to the Program Director who maintains a permanent record of these evaluations. These evaluations are based on achieving the learning objectives and meeting the competency goal as outlined above.

The evaluation is reviewed directly by the attending with the trainee. At approximately four-monthly intervals the Program Director reviews these evaluations with the resident on a one on one meeting. Resident evaluation of both the Faculty and the Inpatient Consult Service Rotation is obtained on a monthly basis. The Program Director reviews the anonymous aggregate evaluation results and discusses the input with the Faculty for the purpose of ongoing Program and Faculty improvement.

Evaluation Methods used:

1. Direct observation of nephrology fellow by attending physicians.
2. Chart review
3. 360 Degree Evaluation from nurses and other health care personnel.
4. Feedback by attending physician at Journal Club, Clinical Conference, and presentation by fellows
5. Communication of patient and family satisfaction
6. Peer evaluation
7. Fellow's self-assessment

Please also see the Evaluation section in Section II.

F. Research Curriculum

A supervised research experience is planned for each resident, who receives supervised training in research under the tutelage of a Nephrology Attending for a period of three months. This period is either a contiguous block or it can be the course of the second year of fellowship training.

Educational Purpose

A To provide the resident with a supervised direct experience that will introduce him/her to the fundamental aspects of planning and executing a research project.

B. To ensure that the resident emerges from this experience equipped with the knowledge of how to critically interpret data and analyze a scientific publication.

Rationale

The rationale behind this exposure is to ensure that the resident will develop an inquiring, analytical and critical approach to clinical problems based upon a rational scientific basis.

Principal Teaching Methods

Direct experience: Each resident chooses a mentor during the latter period of the first year of fellowship training, and under the guidance of the mentor develops the outline of a research protocol that includes enunciating the major issue to be addressed, the background literature that highlights gaps in our knowledge, and the approach to the problem at hand. At the commencement of the second year of fellowship the research plan is expedited in the laboratory of the Faculty Mentor, or in the clinical setting for clinical research.

Research conferences: The resident attends a monthly research seminar in which basic or clinical science topics are discussed. These seminars incorporate ongoing work in the laboratories of faculty members, invited guests from other departments with an emphasis on the basic science departments, and visiting guest scientists. These seminars offer the resident the opportunity to be exposed to a broad array of topics that bear relevance to the development of an inquiring mind. At the culmination of their training period the resident presents his/her work to the faculty and other attendees of this forum.

Presentations at National Meetings: In their senior year the resident is expected to present his research work in the format of an oral or poster presentation at a regional or national scientific meeting.

1. PATIENT CARE

Goal: Residents must be able to provide research related patient care that is compassionate, appropriate, and effective for the administration of research.

Learning Objectives:

When conducting a study involving patients, the 1st and 2nd year nephrology fellow will learn to

1. communicate effectively and demonstrate caring and respectful behaviors when interacting with patients and their families
2. gather essential and accurate information about the patients in research
3. counsel and educate patients properly about the rationale, potential risks and potential benefits of participating in the study
4. obtain IRB consent with the appropriate supervision of the Principle Investigator
5. perform competently all appropriate research specific procedures

2. MEDICAL KNOWLEDGE

Goal: Residents must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological, and social-behavioral sciences, as well as the application of this knowledge to patient care.

Learning Objectives:

Most Important Educational Content

A. Participation in a Research Project: Emphasis is placed on data generation, collection and analysis. With regard to bench research the resident is instructed in, and gains practical experience in a number of basic techniques that include centrifugation, solution preparation, techniques of tissue culture, specific biochemical assays and in some instances principals of gel preparation and loading. With regard to clinical research the resident is instructed in, and gains practical experience in patient recruitment, patient interviews, collection and analysis of relevant samples and compilation of criteria relevant to that project

B. Design of a Research Project: The resident is instructed in the fundamentals of development of a research project. This includes the importance of formulating a clear hypothesis, outlining the specific objectives to be attained, critically evaluating the literature and delineating the gaps to be filled, detailing the experimental approach, pointing out potential pitfalls with alternative approaches as a back-up, and delineating the statistical analysis of the findings. In the case of clinical trials that involve human subjects, the importance of the concept of informed consent is stressed. The humanistic aspects of experiments requiring animal investigation is also emphasized.

C. Authorship of Manuscripts: The resident is instructed in the fundamentals of scientific writing, with a need to pay scrupulous attention to details. Reporting findings vs. interpreting observations is stressed. As a co-author, the resident gains first hand experience in the construction of a manuscript under the guidance of a Faculty Mentor.

3. PRACTICE-BASED LEARNING AND IMPROVEMENT

Goal: Residents must be able to investigate and evaluate their patient care practices, appraise and assimilate scientific evidence, and improve their patient care practices.

Learning Objectives:

The 1st and 2nd year nephrology fellows will learn to:

1. use information technology, e.g. PubMed literature search, to review relevant research methodology, data and conclusions.
2. identify and perform appropriate learning activities including, but not limited to, review of methodologies, practice of bench research techniques, and statistical analysis methods.

4. INTERPERSONAL AND COMMUNICATION SKILLS

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

Learning Objectives:

The 1st and 2nd year nephrology fellows will be able to

1. communicate the pertinent and critical components of the study design rationale, data collection process, methodology, statistical analysis and interpretation to other research related personnel.

2. keep legible research records with all pertinent information to facilitate conduction of the research project and clear retrospective review of data

5. PROFESSIONALISM

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

Learning Objectives:

The 1st and 2nd year nephrology fellows will be able to:

1. advocate for patient's welfare under research, beyond the interests of the researchers
2. demonstrate a commitment to ethical principles of research and humanity, confidentiality of participant information and adherence to informed consent
3. demonstrate sensitivity, awareness and responsiveness to patients' motives in research participation including their socioeconomic status and inadequate medical care. One should ensure that potential participants are not taken advantage of.

6. SYSTEMS-BASED PRACTICE

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

Learning Objectives:

The 1st and 2nd year nephrology fellow will be able to:

1. understand how their research activities affect other health care professionals, the health care organization, and the larger society and how these elements of the system affect their own research practice.
2. know how to improve research related processes through partnership with research resources without compromising integrity.

Procedural Skills

No clinical procedures are expected as an integral part of the Research Rotation.

Educational Material

A. Textbooks:
   1. Marks: Designing a Research Project
   2. Kanare: Writing the Laboratory Notebook
   3. Hawkins and Sorii: Research, How to Plan, Speak and Write About it
   4. Daniel: Biostatistics: A Foundation for Malysis in the Health Sciences
   5. Altman: Practical Statistics for Medical Research
   6. Norman and Streiner: P00 Statistics

B. Journals:

The resident will be directed to the key journals dealing with the topic at hand. The resident is evaluated by the Faculty Mentor using the guidelines delineated in earlier sections.

Evaluation:

During the rotation the resident receives concurrent feedback from the Attending. At the end the rotation the Attending completes a formal written evaluation of the resident which is submitted to the

Program Director who maintains a permanent record of these evaluations. These evaluations are based on achieving the learning objectives and meeting the competency goal as outlined above.

The evaluation is reviewed directly by the attending with the trainee. At approximately four-monthly intervals the Program Director reviews these evaluations with the resident on a one on one meeting. Resident evaluation of both the Faculty and the Inpatient Consult Service Rotation is obtained on a monthly basis. The Program Director reviews the anonymous aggregate evaluation results and discusses the input with the Faculty for the purpose of ongoing Program and Faculty improvement.

Evaluation Methods used:

1. Direct observation of nephrology fellow by supervising attending physicians.
2. Study chart and protocol review
3. 360 Degree Evaluation from health care personnel.
4. Feedback by attending physician at Research Conference, Journal Club, and research related presentation by fellows
5. Fellow's self-assessment

Please also see the Evaluation section in Section II.

G. Conferences

Clinical conference

Overview:	Covers a broad range of nephrology topics. Active cases on the inpatient consultative service or in the ambulatory setting are discussed. In some instances the format of the conference is a didactic lecture on a specific subject.
Time:	Thursday 9:00-10:00 am weekly
Moderator:	Steven Fishbane MD
Location:	WUH Nephrology Office
Attendance:	All faculty and residents in nephrology
Presenter	Resident
Educational purpose:	Considerations involved in assembling a differential diagnosis Update on approach to management of complex cases Update of literature as it pertains to the problem at hand

Journal Club

Time:	Tuesday 12:00-1:00 pm weekly
Moderator:	Steven Fishbane MD
Location:	WUH Nephrology Office
Attendance:	All faculty and residents in nephrology
Presenter	Resident
Educational purpose:	Keep abreast of the nephrology literature Evaluate study design

Renal Grand Rounds

Time:	Friday 11:00am-12:00 pm weekly
Moderator:	Steven Fishbane MD
Location:	WUH Nephrology Office
Attendance:	All faculty and residents in nephrology
Presenter	Guest, Attending, or Resident
Educational purpose:	Update Topics in Renal Disease

Research Conferences

Time:	First Tuesday of each month, 12:00 – 1:00 pm
Moderator:	Steven Fishbane MD
Location:	WUH Nephrology Office
Attendance:	All faculty and residents in nephrology
Presenter	Varies
Educational purpose:	Keep abreast of laboratory activity Review clinical studies

Board-Type Question Review

Time:	First Monday of each month, 12:00 - 1:00 pm
Moderator:	Naveed Masani, MD
Location:	WUH Nephrology Office
Attendance:	All faculty and residents in nephrology
Presenter	Resident
Educational purpose:	Prepare fellows for the Board Examinations

Core Curriculum Lectures

Time:	Variable
Moderator:	Faculty
Location:	WUH Nephrology Office
Attendance:	All residents in nephrology
Presenter	Varies
Educational purpose:	Core Nephrology lectures

Winthrop Pathology Conference

Time:	Variable
Moderator:	Faculty and Dr. Valderama
Location:	WUH Pathology Office
Attendance:	All residents in nephrology
Presenter	Varies
Educational purpose:	Review of Renal Pathology Cases from WUH

Columbia-Winthrop Joint Pathology Conference

Time:	Variable
Moderator:	Faculty and Dr. Glen Markowitz
Location:	Varies
Attendance:	All residents in nephrology
Presenter	Varies
Educational purpose:	Review of Renal Pathology Cases from WUH and Columbia Presbyterian Hospital.

Department of Internal Medicine Core Curriculum

Time:	Variable
Moderator:	Varies
Location:	Varies
Attendance:	All residents in nephrology
Presenter	Varies
Educational purpose:	Common core curriculum topics through Department of Medicine are discussed.

H. Backup Policy

Fellowship duty hours must be limited to 80 hours per week, inclusive of all in-house call activities. Fellows must be provided with 1 in 7 free from all educational and clinical responsibilities, inclusive of call. Adequate time for rest and personal activities must be provided. This consists of a 10 hour time period provided between all daily duty periods and after in-house call. The call schedule is limited to no frequent than every 3rd night.

A backup policy is instituted to prevent excessive fatigue among the residents. The back up support system will be triggered if:
(i) a resident has exceeded his/her duty hours
(ii) the patient care responsibilities are unusually difficult or prolonged
(iii) unexpected circumstances create fatigue sufficient to jeopardize patient care

Under such circumstances:
(a) The attending physician who is supervising the resident during the regular work week will be responsible for covering the resident's clinical responsibilities.

(b) For the weeknight and the weekend coverage, the attending physician assigned to be on call with the resident over the weeknight and/or the weekend coverage will be responsible for covering the resident's clinical responsibilities.

I. Overnight On-Call Duty

Overnight calls are pager calls from home. The fellows are required to come in to the hospital for acute consults and urgent situations. The fellows are also expected to review each acute consult and any clinical issues with the supervising attending physician on-call along with the fellow.