MD NEPHROLOGY CURRICULUM

STATUTES

Nomenclature Of The Proposed Course

The name of degree programme shall be MD Nephrology. This name is well recognized and established for the last many decades worldwide*.*

Course Title:

MD Nephrology

Training Centers

Departments of Nephrology (accredited by RMU) in affiliated institute of Rawalpindi Medical University, Rawalpindi

Duration of Course

The duration of MD Nephrology course shall be five (5) years with structured training in a recognized department under the guidance of an approved supervisor.

After admission in MD Nephrology Programme the resident will spend first 6 Months in the relevant Department of Nephrology as **Induction period** during which resident will get orientation about the chosen discipline and will also participate in the **mandatory workshops** (Appendix E). The research project will be designed and the topic of **synopsis** be prepared during this period.
On completion of Induction period the resident will start formal training in the Basic Principles of Internal Medicine for 10 months and allied rotations for 08 Months, during this period the resident must get the research synopsis approved by IRB. At end of first year trainee will appear in inhouse first year training exam. At the end of 2 year, the candidate will take up Intermediate Examination.
During the 3rd, 4th & 5th years, of the Program, there will be two components of the training

1) Clinical Training in Nephrology
2) Research and Thesis writing

The candidate will undergo clinical training to achieve the educational objectives of M.D. Nephrology Programme (knowledge & Skills) alongwith rotations in the relevant fields, during 4th & 5th year of the Programme.

The clinical training shall be competency based. There shall be generic and specialty specific competencies and shall be assessed by continuous Internal Assessment. (Appendix F&G).

The Research Component and thesis writing shall be complete over the four years duration of the Programme. Candidates will spend total time equivalent one calendar year for research during the training. Research can be done as oneblock or in small periodic rotation as long as total research time is equivalent to one calendar year.

Admission Criteria

Applications for admission to MD Training Programs of University will be invited through advertisement in print and electronic media mentioning closing date of applications and date of Entry Examination.

Eligibility: The applicant on the last date of submission of applications for admission must possess the:

i) Basic Medical Qualification of MBBS or equivalent medical qualification recognized by Pakistan Medical & Dental Council.

ii) Certificate of one year's House Job experience in institutions recognized by Pakistan Medical & Dental Council Is essential at the time of interview. The applicant is required to submit Hope Certificate from the concerned Medical Superintendent that the House Job shall be completed before the Interview.

iii) Valid certificate of permanent or provisional registration with Pakistan Medical & Dental Council.

Registration and Enrollment

- As per policy of Pakistan Medical & Dental Council the number of PG Trainees/ Students per supervisor shall be maximum 05 per annum for all PG programmes including minor programmes (if any).
- Beds to trainee ratio at the approved teaching site shall be at least 5 beds per trainee.
- The University will approve supervisors for MD courses.
- Candidates selected for the courses after their enrollment at the relevant institutions shall be registered with UHS as per prescribed Registration Regulations.

Accreditation Related Issues of the Institution

1. Faculty

Properly qualified teaching staff in accordance with the requirements of Pakistan Medical and Dental Council (PMDC)

2. Adequate Space

Including class-rooms (with audiovisual aids), demonstration rooms, computer lab and clinical pathology lab etc.

3. Library

Departmental library should have latest editions of recommended books, reference books and latest journals (National and International).

- Accreditation of Nephrology training program can be suspended on temporary or permanent basis by the University, if the program does not comply with requirements for residents training as laid out in this curriculum.
- Program should be presented to the University along with a plan for implementation of curriculum for training of residents.
- Programs should have documentation of residents training activities and evaluation on monthly basis.
- To ensure a uniform and standardized quality of training and availability of the training facilities, the University reserves the right to make surprise visits of the training program for monitoring purposes and may take appropriate action if deemed necessary.

AIMS AND OBJECTIVES OF THE COURSE

AIM

The aim of five years MD programme in Nephrology is to train residents to acquire the competency of a specialist in the field of Nephrology so that they can become good teachers, researchers and clinicians in their specialty after completion of their training.

GENERAL OBJECTIVES

MD Nephrology training should enable a student to:

Access and apply relevant knowledge to clinical practice:

- Maintain currency of knowledge
- Apply scientific knowledge in practice
- Appropriate to patient need and context
- Critically evaluate new technology

- Safely and effectively performs appropriate clinical skills & procedures:
  - Consistently demonstrate sound clinical skills
  - Demonstrate procedural knowledge and technical skill at a level appropriate to the level of training
  - Demonstrate manual dexterity required to carry out procedures
  - Adapt their skills in the context of each patient and procedure
  - Maintain and acquire new skills
  - Approach and carries out procedures with due attention to safety of patient, self and others
  - Critically analyze their own clinical performance for continuous improvement

- Design and implement effective management plans:
    - Recognize the clinical features, accurately diagnose and manage nephrological problems
    - Formulate a well-reasoned provisional diagnosis and management plan based on a thorough history and examination
    - Formulate a differential diagnosis based on investigative findings
    - Manage patients in ways that demonstrate sensitivity to their physical, social, cultural and psychological needs
    - Recognize disorders of the Nephrological system and differentiate those amenable to medical treatment
    - Effectively recognize and manage complications
    - Accurately identify the benefits, risks and mechanisms of action of current and evolving treatment modalities
    - Indicate alternatives in the process of interpreting investigations and in decision-making
    - Manage complexity and uncertainty
    - Consider all issues relevant to the patient
    - Identify risk
    - Assess and implement a risk management plan
    - Critically evaluate and integrate new technologies and techniques.
- Organize diagnostic testing, imaging and consultation as needed:
    - Select medically appropriate investigative tools and monitoring techniques in a cost-effective and useful manner
    - Appraise and interpret appropriate diagnostic imaging and investigations according to patients' needs
    - Critically evaluates the advantages and disadvantages of different investigative modalities Communicate effectively

- Communicate appropriate information to patients (and their family) about procedures, potentialities and risks associated, in ways that encourage their participation in informed decision making
- Communicate with the patient (and their family) the treatment options including benefits and risks of each
- Communicate with and co-ordinate health management teams to achieve an optimal patient management
- Initiate the resolution of misunderstandings or disputes
- Modify communication to accommodate cultural and linguistic sensitivities of the patient

- Recognize the value of knowledge and research and its application to clinical practice:
    - Assume responsibility for self-directed learning
    - Critically appraise new trends in Nephrology
    - Facilitate the learning of others

- Appreciate ethical issues associated with Nephrology:
    - Consistently apply ethical principles
    - Identify ethical expectations that impact on medico-legal issues
    - Recognize the current legal aspects of informed consent and confidentiality
    - Be accountable for the management of their patients.

- Professionalism by:
    - Employing a critically reflective approach to Nephrology
    - Adhering with current regulations concerning workplace harassment
    - Regularly carrying out self and peer reviewed audit
    - Acknowledging and have insight into their own limitations
    - Acknowledging and learning from mistakes
- Work in collaboration with members of an interdisciplinary team where appropriate:
    - Collaborate with other professionals in the selection and use of various types of treatments assessing and weighing the indications and contraindications associated with each type
    - Develop a care plan for a patient in collaboration with members of an interdisciplinary team
    - Employ a consultative approach with colleagues and other professionals
    - Recognize the need to refer patients to other professionals.
- Management and Leadership
    - Effective use of resources to balance patient care and system resources
    - Identify and differentiate between system resources and patient needs
    - Prioritize needs and demands dealing with limited system resources.
    - Manage and lead clinical teams
    - Recognize the importance of different types of expertise which contribute to the effective functioning of clinical team
    - Maintain clinically relevant and accurate contemporaneous records
- Health advocacy:
    - Promote health maintenance of patients
    - Advocate for appropriate health resource allocat

SPECIFIC LEARNING OUTCOMES

Residents completing MD Nephrology training will have formal instruction, clinical experience, and will be able to demonstrate competence in the evaluation and management of adult and paediatric patients and applying scientific principles for the identification, prevention, treatment and rehabilitation of following acute and chronic disorders in Nephrology.Pathophysiology, pathology, natural history and management of glomerular, tubulo-intestitial and vascular diseases of the kidney. The candidate should be familiar with both primary renal diseases and those which occur in the contextof systemic disorders such as diabetes mellitus, connective tissue disease, infectious diseases, haematological diseases, as well as other metabolic infiltrative and inflammatory diseases and also in the context of diseases in remote organ systems such as heart failure and hepato-renal syndrome.

The diseases unique to our region or which occur predominantly in a third worldsetting should be appreciated and understood.

- The diagnosis, differential diagnosis, investigation and management of acute renal failure and its complications.
- The diagnosis, differential diagnosis, investigation and management of chronic renal failure and its complications.
- The physiology of, indications for, complications of, the various forms of haemodialysis and peritoneal dialysis. Experience with the management of patients on acute and chronic dialysis.
- The diagnosis, physiology, pathophysiology and therapy of disorders of water, sodium, potassium and acid-base regulation.
- The diagnosis, pathophysiology and therapy of disorders of calcium, phosphorus and magnesium balance.
- Renal pharmacology including the effect of disturbances in renal function of the use of common drugs, the effects of various drugs and therapeutic procedures on the kidney, toxicology, the use of dialysis in the treatment of overdoses and poisoning.
- The diagnosis, differential diagnosis and therapy of all forms of hypertension, including complications of anti-hypertensive medications.
- Pathogenesis and management of renal stone formation and urinary tract infection.
- The diagnosis, investigation, medical management of urinary tract obstruction.
- The principles of immunology involved in the mechanisms of renal disease.
- The management of renal transplant, including understanding of the donor and the recipient's selection, histocompatibility typing, mechanisms of rejection and management of immunosuppression and its complications.
- Genetics, cell biology and molecular medicine as applicable to renal disease.
- Ethical issues related to the practice of renal medicine in South Africa and the African continent.

- Additional skills
- Candidates would be expected to develop the following skills:
- Urinalysis including examination of the urine sediment.
- The performance and interpretation of the renal function tests.
- Interpretation of radiological, radio-isotopic and ultrasound examination of the urinary tract.

- Performance of renal biopsies, including indications, preparation and complications.
- Interpretation of basic renal histopathology.
- The ability to establish access for acute dialysis.
- Critical appraisal of scientific publications, including basic research, pertinent nephrology.
- Manage other staff working in a renal unit in a team fashion.
- Basic administrative skill required in the management of dialysis unit and renal patients.
- Be able to do basic costing and cost analysis in the treatment of patients with renal disease.
- Be able to identify the problems unique to practicing renal medicine in a developing country.
- Understand the principles of scientific research and be able to write a basic research protocol, as well as be able to conduct a scientific study.
- Active participation in relevant:
    - Congresses
    - Organized CME's
    - Academic meetings
    - Research programmes

IN-HOUSE FIRST YEAR EXAMINATION

All candidates admitted in MD Nephrology course shall appear in in-house first year exam at the end of first year of their training.

Eligibility Criteria:

The candidates appearing in-house first year Examination of the M.D. Nephrology Programme are required:

a) To have submitted certificate of completion of mandatory workshops.

b) To have submitted certificate / certificates of completion of first year of training from the supervisor .

c) To have submitted CIS assessment proforma from his/her own supervisor on 03 monthly basis and also from his/her supervisors during rotation, achieving a cumulative score of 75%.

Intermediate Examination of MD Nephrology Programme

All candidates admitted in MD Nephrology course shall appear in Intermediate Examination at the end of 2nd calendar year.

Eligibility Criteria:

The candidates appearing in Intermediate Examination of the M.D. Nephrology Programme are required:

a) To have submitted certificate of completion of mandatory workshops.
b) To have submitted certificate / certificates of completion of first two years of training from the supervisor / supervisors of rotations.
c) To have submitted CIS assessment proforma from his/her own supervisor on 06 monthly basis and also from his/her supervisors during rotation, achieving a cumulative score of 75%.
d) To have submitted certificate of approval of synopsis or undertaking / affidavit that if synopsis not approved with 30 days of submission of application for the Intermediate Examination, the candidate will not be allowed to take the examinations and shall be removed from the training programme.
e) To have submitted evidence of payment of examination fee.

Intermediate Examination Schedule and Fee

a) Intermediate Examination at completion of two years training, will be held twice a year.

b) There will be a minimum period of 30 days between submission of application for the examination and the conduction of examination.

c) Examination fee will be determined periodically by the University.

d) The examination fee once deposited cannot be refunded / carried over to the next examination under any circumstances.

e) The Controller of Examinations will issue Roll Number Slips on receipt of prescribed application form, documents satisfying eligibility criteria and evidence of payment of examination fee.

Declaration of Results

The Candidate will have to score 50% marks in written, clinical and oral components and a cumulative score of 60% to be declared successful in the Intermediate Examination.

A maximum total of four consecutive attempts (availed or unavailed) will be allowed in the Intermediate Examination during which the candidate will be allowed to continue his training program. If the candidate fails to pass his Intermediate Examination within the above mentioned limit of four attempts, the candidate shall be removed from the training program, and the seat would fall vacant, stipend/ scholarship if any would be stopped.

Final Examination of MD Nephrology Programme

All candidates admitted in MD Nephrology course shall appear in Final examination at the end of structured training programme (end of 5th calendar year), and having passed the Intermediate examination.

Eligibility Criteria:

To appear in the Final Examination the candidate shall be required:

i) To have submitted the result of passing Intermediate Examination.

ii) To have submitted the certificate of completion of training, issued by the Supervisor will be mandatory.

iii) To have achieved a cumulative score of 75% in Continuous Internal assessments of all training years.

iv) To have got the thesis submitted and will then be eligible to appear in Final Examination.

v) To have submitted no dues certificate from all relevant departments including library, hostel, cashier etc.

vi) To have submitted evidence of submission of examination fee.

Final Examination Schedule and Fee

a) Final examination will be held twice a year.

b) The candidates shall have to satisfy eligibility criteria before permission is granted to take the examination.

c) Examination fee will be determined and varied at periodic intervals by the University.

d) The examination fee once deposited cannot be refunded / carried over to the next examination under any circumstances.

e) The Controller of Examinations will issue an Admittance Card with a photograph of the candidate on receipt of prescribed application form, documents satisfying eligibility criteria and evidence of payment of examination fee. This card will also show the Roll Number, date / time and venue of examination.

Written Part of Final Examination

a) The candidates securing a score of 60% marks in multiple choice question paper and SEQ will pass the written part of the final examination and will become eligible to appear in the clinical and oral examination.

b) The written part result will be valid for three consecutive attempts for appearing in the Clinical and Oral Part of the Final Examination. After that the candidate shall have to re-sit the written part of the Final Examination.

Clinical, TOACS/OSCE & ORAL:

a) The Clinical and and Toacs/OSCE & Oral will consist of 04 short cases, 01 long case and and Toacs/OSCE & Oral with 01 station for a pair of Internal and External Examiner Each short case will be of 07 minutes duration, 05 minutes will be for examining the patient and 02 minutes for discussion. The Oral Examination will consist of laboratory data assessment, interpretation of Radiology images, ECG and others.

b) A panel of four examiners will be appointed by the Vice Chancellor and of these two will be from university whilst the other two will be the external examiners. Internal examiner will act as a coordinator. In case of difficulty in finding an Internal examiner in a given subject, the Vice Chancellor would, in consultation with the concerned Deans, appoint any relevant person with appropriate qualification and experience, outside the University as an examiner.

c) The internal examiners will not examine the candidates for whom they have acted as Supervisor and will be substituted by other internal examiner.

d) The candidates scoring 60% marks in each component of the Clinical & Oral Examination will pass this part of the Final Examination.

e) The candidates will have two attempts to pass the final examination with normal fee.

Declaration of Result

For the declaration of result

I. The candidate must get his/her Thesis accepted.

II. The candidate must have passed the final written examination with 50% marks and the clinical & oral examination securing 50%

marks. The cumulative passing score from the written and clinical/ oral examination shall be 60%. Cumulative score of 60% marks to be calculated by adding up secured marks of each component of the examination i.e written and clinical/ oral and then calculating its percentage.

III. The MD degree shall be awarded after acceptance of thesis andsuccess in the final examination.

IV. On completion of stipulated training period, irrespective of the result (pass or fail) the training slot of the candidate shall be declared vacant.

Submission / Evaluation of Synopsis

1. The candidates shall prepare their synopsis as per guidelines provided by the Advanced Studies & Research Board, available on university website.
2. The research topic in clinical subject should have 30% component related to basic sciences and 70% component related to applied clinical sciences. The research topic must consist of a reasonable sample size and sufficient numbers of variables to give training to the candidate to conduct research, to collect & analyze the data.
3. Synopsis of research project shall be submitted during of the 3rd year of MD program. The synopsis after review by an Institutional Review Committee shall be submitted to the University for consideration by the Advanced Studies & Research Board, through the Principal / Dean /Head of the institution.

Submission of Thesis

1. Thesis shall be submitted by the candidate duly recommended by the Supervisor.
2. The research thesis must be compiled and bound in accordance with the Thesis Format Guidelines approved by the University and available on website.

3. The research thesis will be submitted along with the fee prescribed by the University at least 6months before appearing in final exit exam.

Thesis Examination

a) The Thesis along with a certificate of approval from the supervisory will be submitted to the Registrar's office, who would record the date / time etc. and get received from the Controller of Examinations within 05 working days of receiving.

b) The Controller of Examinations will submit a panel of eight examiners within 07 days for selection of four examiners by the Vice Chancellor. The Vice Chancellor shall return the final panel within 05 working days to the Controller of Examinations for processing and assessment. In case of any delay the Controller of Examinations would bring the case personally to the Vice Chancellor.

c) The Supervisor shall not act as an examiner of the candidate and will not take part in evaluation of thesis.

d) The Controller of Examinations will make sure that the Thesis is submitted to examiners in appropriate fashion and a reminder is sent after every ten days.

e) The thesis will be evaluated by the examiners within a period of 06 weeks.

f) In case the examiners fail to complete the task within 06 weeks with 02 fortnightly reminders by the Controller of Examinations, the Controller of Examinations will bring it to the notice of Vice Chancellor in person.

g) In case of difficulty in find an internal examiner for thesis evaluation, the Vice Chancellor would, in consultation with the concerned Deans, appoint any relevant person as examiner in supersession of the relevant Clause of the University Regulations.

h) There will be two internal and two external examiners. In case of difficulty in finding examiners, the Vice Chancellor would, in consultation with the concerned Deans, appoint minimum of three, one internal and two external examiners.

i) The total marks of thesis evaluation will be 100 and 60% marks will be required to pass the evaluation.

j) The thesis will be considered accepted, if the cumulative score of all the examiners is 60%.

k) The clinical training will end at completion of stipulated training period but the candidate will become eligible to appear in the Final Examination at completion of clinical training and after acceptance of thesis. In case clinical training ends earlier, the slot will fall vacant after stipulated training period.

6. Award of MD Nephrology Degree

After successful completion of the structured courses of MD Nephrology and Qualifying Intermediate and Final examinations (Written, Clinical, TOACS /OSCE & ORAL), the degree with title MD Nephrology shall beawarded.

CONTENT OUTLINE

MD Nephrology

Basic Principles of Internal Medicine

Resident should get exposure in the following organ and system competencies (listed below) while considering and practicing each system in terms of:-

- Medical ethics
- Professional values, student teachers relationship
- Orientation of in-patient, out-patients and Nephrological labs
- Approach to the patient
- History taking
- General physical examination
- Systemic examination
- Routine investigations Special investigations
- Diagnostic and therapeutic procedures

Course Contents:

1. Cardiovascular Medicine

Common and / or important Cardiac Problems:

- Arrhythmias
- Ischaemic Heart Disease: acute coronary syndromes, stable angina, atherosclerosis
- Heart Failure
- Hypertension – including investigation and management of accelerated hypertension
- Valvular Heart Disease
- Endocarditis
- Aortic dissection
- Syncope
- Dyslipidaemia

Clinical Science:

- Physiological principles of cardiac cycle and cardiac conduction
- Pharmacology of major drug classes: beta blockers, alpha blockers, ACE inhibitors, Angiotensin receptor blockers (ARBs), anti-platelet agents, thrombolysis, inotropes, calcium channel antagonists, potassium channel activators, diuretics, anti-arrhythmics, anticoagulants, lipid modifying drugs, nitrates, centrally acting anti-hypertensives

2. Dermatology;

Common and / or Important Problems:

- Cellulitis
- Cutaneous drug reactions
- Psoriasis and eczema
- Skin failure: e.g. erthryoderma, toxic epidermal necrolysis
- Urticaria and angio-oedema
- Cutaneous vasculitis
- Herpes zoster and Herpes Simplex infections
- Skin tumours
- Skin infestations
- Dermatomyositis

- Scleroderma
- Lymphoedema

***Clinical Science**:*

- Pharmacology of major drug classes: topical steroids, immunosuppressants

3. Diabetes & Endocrine Medicine

Common and / or Important Diabetes Problems:

- Diabetic ketoacidosis
- Non-acidotic hyperosmolar coma / severe hyperglycaemia
- Hypoglycaemia
- Care of the acutely ill diabetic
- Peri-operative diabetes care

Common or Important Endocrine Problems:

- Hyper/Hypocalcaemia
- Adrenocortical insufficiency
- Hyper/Hyponatraemia
- Thyroid dysfunction
- Dyslipidaemia
- Endocrine emergencies: myxoedemic coma, thyrotoxic crisis, Addisonian crisis, hypopituitary coma, phaeochromocytoma crisis

Clinical Science:

- Outline the function, receptors, action, secondary messengers and feedback of hormones
- Pharmacology of major drug classes: insulin, oral anti-diabetics, thyroxine, anti-thyroid drugs, corticosteroids, sex hormones, drugs affecting bone metabolism

4. Respiratory Medicine

Common and / or Important Respiratory Problems:

- COPD
- Asthma
- Pneumonia
- Pleural disease: Pneumothorax, pleural effusion, mesothelioma
- Lung Cancer
- Respiratory failure and methods of respiratory support
- Pulmonary embolism and DVT
- Tuberculosis
- Interstitial lung disease

- Bronchiectasis
- Respiratory failure and cor-pulmonale
- Pulmonary hypertension

Clinical Science:

- Principles of lung function measurement

- Pharmacology of major drug classes: bronchodilators, inhaled corticosteroids, leukotriene receptor antagonists, immunosuppressants

5. Allergy

Common or Important Allergy Problems

- Anaphylaxis
- Recognition of common allergies; introducing occupation associated allergies
- Food, drug, latex, insect venom allergies
- Urticaria and angioedema

Clinical Science

- Mechanisms of allergic sensitization: primary and secondary prophylaxis
- Natural history of allergic diseases
- Mechanisms of action of anti-allergic drugs and immunotherapy
- Principles and limitations of allergen avoidance

6. Haematology

Common and / or Important Problems:

- Bone marrow failure: causes and complications
- Bleeding disorders: DIC, haemophilia
- Thrombocytopaenia
- Anticoagulation treatment: indications, monitoring, management of over-treatment
- Transfusion reactions
- Anaemia: iron deficient, megaloblastic, haemolysis, sickle cell,
- Thrombophilia: classification; indications and implications of screening
- Haemolytic disease
- Myelodysplastic syndromes
- Leukaemia
- Lymphoma
- Myeloma
- Myeloproliferative disease

- Inherited disorders of haemoglobin (sickle cell disease, thalassaemias)
- Amyloid

Clinical Science:

- Structure and function of blood, reticuloendothelial system, erythropoietic tissues

7. Immunology

Common or Important Problems:

- Anaphylaxis (see also 'Allergy')

Clinical Science:

- Innate and adaptive immune responses
- Principles of Hypersensitivity and transplantation

8. Infectious Diseases

Common and / or Important Problems:

- Fever of Unknown origin
- Complications of sepsis: shock, DIC, ARDS
- Common community acquired infection: LRTI, UTI, skin and soft tissue infections, viral exanthema, gastroenteritis
- CNS infection: meningitis, encephalitis, brain abscess
- HIV and AIDS including ethical considerations of testing
- Infections in immuno-compromised host
- Tuberculosis
- Anti-microbial drug monitoring
- Endocarditis
- Common genito-urinary conditions: non-gonococcal urethritis, gonorrhoea, syphilis

Clinical Science:

- Principles of vaccination
- Pharmacology of major drug classes: penicillins, cephalosporins, tetracyclines, aminoglycosides, macrolides, sulphonamides, quinolones, metronidazole, anti-tuberculous drugs, anti-fungals, anti-malarials, anti- helminthics, anti-virals

9. Medicine in the Elderly

Common or Important Problems:

- Deterioration in mobility
- Acute confusion
- Stroke and transient ischaemic attack
- Falls
- Age related pharmacology
- Hypothermia
- Continence problems
- Dementia
- Movement disorders including Parkinson's disease
- Depression in the elderly
- Osteoporosis
- Malnutrition
- Osteoarthritis

Clinical Science:

- Effects of ageing on the major organ systems
- Normal laboratory values in older people

10. Musculoskeletal System

Common or Important Problems:

- Septic arthritis
- Rheumatoid arthritis
- Osteoarthritis
- Seronegative arthritides
- Crystal arthropathy
- Osteoporosis – risk factors, and primary and secondary prevention of complications of osteoporosis
- Polymyalgia and temporal arteritis
- Acute connective tissue disease: systemic lupus erythematosus, scleroderma, poly- and dermatomyositis, Sjogren's syndrome, vasculitides

Clinical Science:

- Pharmacology of major drug classes: NSAIDS, corticosteroids, immunosuppressants, colchicines, allopurinol, bisphosphonates

11. Neurology

Common or Important Problems:

- Acute new headache
- Stroke and transient ischaemic attack
- Subarachnoid haemorrhage
- Coma
- Central Nervous System infection: encephalitis, meningitis, brain abscess
- Raised intra-cranial pressure
- Sudden loss of consciousness including seizure disorders (see also above syncope etc)
- Acute paralysis: Guillian-Barré, myasthenia gravis, spinal cord lesion
- Multiple sclerosis
- Motor neuron disease

Clinical Science:

- Pathophysiology of pain, speech and language
- Pharmacology of major drug classes: anxiolytics, hypnotics inc. benzodiazepines, antiepileptics, anti-Parkinson's drugs (anti-muscarinics, dopaminergics)

12. Psychiatry

Common and /or Important Problems:

- Suicide and parasuicide
- Acute psychosis
- Substance dependence
- Depression

Clinical Science*:*

- Principles of substance addiction, and tolerance
- Pharmacology of major drug classes: anti-psychotics, lithium, tricyclic antidepressants, mono-amine oxidase inhibitors, SSRIs, venlafaxine,

donepezil, drugs used in treatment of addiction (bupropion, disulpharam, acamprosate, methadone)

13. Cancer and Palliative Care

Common or Important Nephrology Problems:

- Hypercalcaemia
- SVC obstruction
- Spinal cord compression
- Neutropenic sepsis
- Common cancers (presentation, diagnosis, staging, treatment principles): lung, bowel, breast, prostate, stomach, oesophagus, bladder)

Common or Important Palliative Care Problems:

- Pain: appropriate use, analgesic ladder, side effects, role of radiotherapy
- Constipation
- Breathlessness
- Nausea and vomiting
- Anxiety and depressed mood

Clinical Science:

- Principles of oncogenesis and metastatic spread
- Apoptosis
- Principles of staging
- Principles of screening
- Pharmacology of major drug classes in palliative care: anti-emetics, opioids, NSAIDS, agents for neuropathic pain, bisphosphonates, laxatives, anxiolytics

Investigation Competencies

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Outline the Indications for, and Interpret the Following Investigations:

- Basic blood biochemistry: urea and electrolytes, liver function tests, bone biochemistry, glucose, magnesium
- Inflammatory markers: CRP / ESR
- Arterial Blood Gas analysis
- Cortisol and short Synacthen test
- HbA1C
- Lipid profile
- Amylase
- Full blood count
- Coagulation studies
- Haemolysis studies
- D dimer
- Blood film report
- Blood / Stool / urine culture
- Fluid analysis: peritoneal, ascitic
- Abdominal and pelvic radiograph

  More Advanced Competencies;
- Viral hepatitis serology
- HIV testing
- Ultrasound
- Detailed imaging: Barium studies, CT, CT Gastroenterological angiography, high resolution CT, MRI
- Ambulatory blood pressure monitoring

Procedural Competencies

- The trainee is expected to be competent in performing the following procedures by the end of core training. The trainee must be able to outline the indications for these interventions. For invasive procedures, the trainee must recognize the indications for the procedure, the importance of valid consent, aseptic technique, safe use of local anaesthetics and minimization of patient discomfort.
- Venepuncture
- Cannula insertion, including large bore
- Ascitic tap and aspiration
- Abdominal paracentesis
- Central venous cannulation
- Basic and, subsequently, advanced cardiorespiratory resuscitation
- Urethral catheterization

Specialty training in Nephrology

Specific Program Content

1. Specialized training in Nephrology
2. Compulsory rotations
3. Research & thesis writing
4. Maintaining of Log-book

Specialized training in Nephrology can be divided into the following:

A. General Nephrology

B. Dialysis and Extracorporeal Therapy

C. Renal Transplantation

D. Ambulatory Services [Out-Patient Clinic]

E: Electives

F . Technical and Other Skills

G. Research opportunities

General Nephrology

1. Disorders of mineral metabolism, including nephrolithiasis, osteoporosis and renal osteodystrophy
2. Disorders of fluid, electrolyte, and acid-base balance
3. Acute renal failure

4.Chronic Kidney Disease and its management by conservative and nutrition methods
5. End-stage renal disease
6. Hypertensive disorders
7. Renal disorders of pregnancy
8. Urinary tract infections
9. Tubulointerstitial renal diseases, including inherited diseases of transport, cystic diseases, and other congenital disorders
10. Glomerular and vascular diseases, including the glomerulonephritides, diabetic nephropathy, renovascular disease and microvascular syndromes
11. Malignancy related to the Kidneys
12. Disorders of drug metabolism, adjustment of medications according to the GFR and renal drug toxicity.

Dialysis and Extracorporeal Therapy

Each trainee will be exposed to dialysis and extracorporeal therapies. During this rotation, the trainee evaluates all initial consults when hemodialysis is considered even if it is not imminent, supervised by the dialysis consultant of the month. The clinical experience includes:

1. Evaluation and selection of patients for acute hemodialysis or continuous renal replacement therapies.

2. Evaluation of end-stage renal disease patients for various forms of therapy and their instruction regarding treatment options. The plan for access placement and evaluation.
3. Drug dosage modification during dialysis and other extracorporeal therapies.
4. Evaluation and management of medical complications in patients during and between dialysis and other extracorporeal therapies, including dialysis access and an understanding of their pathogenesis and prevention.
5. Long-term follow-up of patients undergoing chronic dialysis, including their dialysis prescription and modification and assessment of adequacy of dialysis.
6. An understanding of the principles and practice of peritoneal dialysis, including the establishment of peritoneal access, the principles of dialysis catheters and how to choose appropriate catheters.
7. An understanding of the technology of peritoneal dialysis, including the use of cyclers.

8. Assessment of peritoneal dialysis efficiency, using peritoneal equilibration testing and the indications and interpretation of peritoneal biopsy.
9. An understanding of how to write a peritoneal dialysis prescription and how to assess peritoneal dialysis adequacy.
10. The pharmacology of commonly used medications and their kinetic and dosage alteration with peritoneal dialysis.
11. An understanding of the complications of peritoneal dialysis, including peritonitis and its treatment, exit site and tunnel infections and their management, hernias, pleural effusions, and other less common complications and their management.
12. An understanding of the special nutritional requirements of the hemodialysis and peritoneal dialysis patient.

Renal Transplantation:

The trainee will be part of the Transplantation service to include transplant donor and recipient evaluation, hospital admission of patients receiving transplants or those with transplants who are suffering from acute or chronic complications, as well as the outpatient management of patients post - transplant. **Each trainee will have two months rotation respectively.** The trainee is trained in the pre and post transplant management and follow up of patients. During the rotation, the trainee attends out -patient transplant clinics weekly and participates in management decisions. This transplant experience includes the following:

1. Evaluation and selection of transplant candidates.
2. Preoperative evaluation and preparation of transplant recipients.
3. Observation of at least 3 renal transplant surgeries. Immediate postoperative management of transplant recipients including administration of immunosuppressive drugs.
4. Clinical diagnosis and management of all forms of acute and chronic rejection including laboratory, histopathologic and imaging techniques.
5. Recognition and medical management of the surgical and non surgical complications of transplantation.
6. Long-term follow-up of transplant donors and recipients in the out patient clinic.

Ambulatory Renal Service:

The trainee will spend one-half day each week in the ambulatory practice setting, seeing the entire spectrum of out-patient nephrology. The trainee will evaluate the patients and formulate plans and will discuss the case with the consultant physician. The trainee is responsible for communicating with referral physicians and for longitudinal follow-up of these patients when appropriate. This rotation will expose trainee to:

1. Evaluation and management of patients with hematuria and proteinuria
2. Evaluation and management of the complicated hypertensive patients
3. Management of patients with chronic renal failure
4. Evaluation and management of patients with nephrolithiasis
5. Evaluation of patients for transplantation
6. Transplant donor evaluations
7. Management of patients following renal transplantation

Electives

02 Electives of 1 month each will be provided to the trainee during the General Nephrology Rotation in the 4th Year of training, to spend in:

1. Radiology: This elective should be structured with the Department of Radiology. During this elective, the trainee will attend the various renal-focused procedures and the interpretation sessions.
2. Medical intensive care unit: This elective should be structured with the Department of intensive care. During this elective, the trainee will attend the various renal-focused procedures and the interpretation sessions

Technical and Other Skills trainee will be provided hands on training, including the indications, contraindications, complications, and interpretation of results of the following procedures:

1. Urinalysis: Perform a dipstick urinalysis and prepare urine sediment for microscopy
2. Percutaneous biopsy of native and transplanted kidneys
3. Peritoneal dialysis

4. Placement of temporary vascular access (subclavian, femoral or internal jugular) for hemodialysis and related procedures.
5. Acute and chronic hemodialysis
6. Placement of peritoneal catheters acute and chronic
7. Renal ultrasound (use and interpretation)
8. Continuous hemofiltration, arteriovenous and/or venovenous
9. Placement of temporary peritoneal catheters
10. Perform bladder catheterization

Certain Procedures if not available or performed will be still discussed and opportunities sought to expose the trainee to such procedures.

1. Radiology of vascular access
2. Balloon angioplasty of vascular access
3. Therapeutic plasmapheresis
4. Hemoperfusion
5. Electron microscopy and Immunoflourescence.

PRACTICAL PROCEDURES

Technical Skills

It is essential that every trainee becomes competent in the techniques of:

a) Biopsy of both native and transplanted kidneys.
b) Temporary vascular access.

Diagnostic Techniques

Trainees should understand the indications for and interpretations of the results from the following procedures:

a) Urinalysis
b) Serum biochemistry
c) Percutaneous biopsy of native and transplanted kidneys
d) Ultrasound of the urinary tract
e) Intravenous urography
f) Renal angiography
g) Radionuclide imaging and measurement of renal function
h) CT and MRI scanning

Additional training and experience will be required for trainees wishing to obtain a license from the Administration of Radioactive Substances Advisory Committee (ARSAC) to allow them to personally perform investigations using radioactive substances.

Therapeutic Procedures

Trainees should be aware of the indications for and the contraindications and complications of the following techniques:

a) Peritoneal dialysis, acute and chronic
b) Haemodialysis, acute and chronic
c) Continuous hemofiltration and allied techniques
d) Plasmapheresis
e) Angioplasty
f) Percutaneous nephrostomy

Medical Knowledge

Theoretical knowledge to be acquired during the training period includes:

a) Renal anatomy, physiology and pathology including examination of renal biopsies by light and electron microscopy and immunofluorescent or immunoperoxidase techniques.

b) Disorders of fluids and electrolytes and acid-base balance.

c) Normal mineral metabolism and its alteration in renal disease, metabolic bone disease and nephrolithiasis.

d) Pathogenesis, natural history and management of hereditary, congenital and acquired diseases of the kidney and urinary tract and renal diseases associated with pregnancy and systemic disorders such as diabetes and vasculitides.

e) The pathogenesis and management of urinary tract infections.

f) The pathogenesis and management of acute renal failure.

g) Clinical pharmacology, including drug metabolism and pharmacokinetics and the effects of drugs on renal structure and function.

h) Nutritional aspects of renal disorders.

i) Immunology, including:

1. Basic principles
2. Immunological mechanisms of renal disease
3. Immunological tests relevant to renal disease

j) Normal and deranged blood pressure regulation.

k) Transplantation including:

1. Biology of transplant rejection.
2. Indications for and contraindications to renal transplantation.
3. Principles of transplant recipient evaluation and selection.
4. Principles of evaluation of transplant donors, both live and cadaveric, including histocompatibility testing.
5. Principles of organ harvesting, preservation and storage.

6. Short and long-term complications of transplantation.
7. Mechanisms of action and usage of immunosuppressive drugs.
8. Histopathology of transplant rejection.
9. Psycho-social aspects of organ donation and transplantation.

l) Dialysis and Extra-Corporeal Therapy including:
1. The kinetic principles of both haemodialysis and peritoneal dialysis.
2. The short-term and long-term complications of each mode of dialysis and their management.
3. An understanding of the principles of dialysis access, including indications, techniques and complications. This includes both acute and chronic vascular access and peritoneal access.
4. Prescription of and assessment of adequacy of dialysis, including an understanding of the use and limitations of urea kinetics and protein catabolic rate.
5. The influence of the various dialysis modes on drug metabolism.
6. The nutritional management of haemo and peritoneal dialysis patients.
7. An understanding of the artificial membranes used in haemodialysis and the issue of biocompatibility.
8. The psycho-social and ethical issues of dialysis.

Clinical Rotations

General Nephrology

The trainee will be assigned to the nephrology ward taking care of the nephrology inpatients only. The trainee will also be responsible for the procedures performed, relating to nephrology, in these patients.

Hemodialysis and Peritoneal Dialysis:

The trainee will be assigned to the Dialysis unit taking care of the chronic Hemodialysis and any acute or chronic Peritoneal Dialysis patients.

Transplant service:
The trainee will be assigned to the Renal Transplant Unit taking care of the Renal transplant patients, [pre transplant evaluation, Attend at least 3-5 transplant surgeries, post transplant care, follow up of stable renal transplant patients and managing acute and chronic complications in a renal transplant patient].

Consultation and Ambulatory Clinics [Nephrology and Transplant Services].
Topic assignment and submission for research: 3 months
The trainee will be responsible for evaluating and making initial decisions for all nephrology consultations form the different units of the hospital. The trainee will also be responsible for the procedures performed, relating to nephrology, in these patients.
[The Fellow will see all requests for consultation called in to the Renal Consultation service. After seeing the patient, the fellow discusses the problem with the visit for the Renal Consult service, writes an initial note after communication with the attending nephrologist, and follow-up notes as considered appropriate. Medical Residents rotating on the Renal Service may also take this role, and students are also involved in working up and following these patients. A fixed time is designated each day for the fellow (+/- student and resident) to meet with the attending nephrologist to discuss progress and plans. The fellow sees all the Nephrology Division patients admitted to the hospital, whatever the reason for admission is. If patients areadmitted to the Renal Visit on the private medical service, the fellow and the visit will act as the primary caretakers (in concert with the medical house staff) during hospitalization. When patients are admitted to the medical ward service or other non-medical services, the fellow acts as a consultant giving input as needed and appropriate. The fellow also manages any problems withperitoneal dialysis patients.
The trainee will be assigned to the nephrology and Transplant out patient clinics i.e. 2 half day clinics / week.
During this time the trainee should plan and submit the research topic for approval. This will help the trainee to initiate research during the end of the 3rd year so that ample time is available for conducting the study and analyzing it in the final year.

RESEARCH/ THESIS WRITING

RESEARCH/ THESIS WRITING

Total of one year will be allocated for work on a research project with thesis writing. Project must be completed and thesis be submitted before the end of training. Research can be done as one block in 5th year of training or it can be stretched over five years of training in the form of regular periodic rotations during the course as long as total research time is equivalent to one calendar year.

Research Experience

The active research component program must ensure meaningful, supervised research experience with appropriate protected time for each resident while maintaining the essential clinical experience. Recent productivity by the program faculty and by the residents will be required, including publications in peer- reviewed journals. Residents must learn the design and interpretation of research studies, responsible use of informed consent, and research methodology and interpretation of data. The program must provide instruction in the critical assessment of new therapies and of the surgical literature. Residents should be advised and supervised by qualified staff members in the conduct of research.

Clinical Research

Each resident will participate in at least one clinical research study to become familiar with:

1. Research design

1. Research involving human subjects including informed consent and operations of the Institutional Review Board and ethics of human experimentation
2. Data collection and data analysis
3. Research ethics and honesty
4. Peer review process

This usually is done during the consultation and outpatient clinic rotations

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Case Studies or Literature Reviews
Each resident will write, and submit for publication in a peer-reviewed journal, a case study or literature review on a topic of his/her choice.

Laboratory Research

Bench Research
Participation in laboratory research is at the option of the resident and may be arranged through any faculty member of the Division. When appropriate, the research may be done at other institutions.

Research involving animals
Each resident participating in research involving animals is required to:

1. Become familiar with the pertinent Rules and Regulations of the University of Health Sciences Lahore i.e. those relating to "Health and Medical Surveillance Program for Laboratory Animal Care Personnel" and "Care and Use of Vertebrate Animals as Subjects in Research and Teaching"
2. Read the "Guide for the Care and Use of Laboratory Animals"
3. View the videotape of the symposium on Humane Animal Care

Research involving Radioactivity
Each resident participating in research involving radioactive materials is required to
1. Attend a Radiation Review session
2. Work with an Authorized User and receive appropriate instruction from him/her.

METHODS OF INSTRUCTION/COURSE CONDUCTION

As a policy, active participation of students at all levels will be encouraged. Following teaching modalities will be employed:

1. Lectures
2. Seminar Presentation and Journal Club Presentations
3. Group Discussions
4. Grand Rounds
5. Clinico-pathological Conferences
6. SEQ as assignments on the content areas
7. Skill teaching in ICU, emergency and ward settings
8. Attend genetic clinics and rounds for at least one month.
9. Attend sessions of genetic counseling
10. Self study, assignments and use of internet
11. Bedside teaching rounds in ward
12. OPD & Follow up clinics
13. Long and short case presentations

In addition to the conventional teaching methodologies interactive strategies like conferences will also be introduced to improve both communication and clinical skills in the upcoming consultants. Conferences must be conducted regularly as scheduled and attended by all available faculty and residents. Residents must actively request autopsies and participate in formal review of gross and microscopic pathological material from patients who have been under their care. It is essential that residents participate in planning and in conducting conferences.

1. Clinical Case Conference

Each resident will be responsible for at least one clinical case conference each month. The cases discussed may be those seen on either the consultation or clinic service or during rotations in specialty areas. The resident, with the advice of the Attending Physician on the Consultation Service, will prepare and present the case(s) and review the relevant literature.

2. Monthly Student Meetings

Each affiliated medical college approved to conduct training for MD Nephrology will provide a room for student meetings/discussions such as:

a. Journal Club Meeting
b. Core Curriculum Meetings
c. Skill Development

a. Journal Club Meeting

A resident will be assigned to present, in depth, a research article or topic of his/her choice of actual or potential broad interest and/or application. Two hours per month should be allocated to discussion of any current articles or topics introduced by any participant. Faculty or outside researchers will be invited to present outlines or results of current research activities. The article should be critically evaluated and its applicable results should be highlighted, which can be incorporated in clinical practice. Record of all such articles should be maintained in the relevant department.

b. Core Curriculum Meetings

All the core topics of Nephrology should be thoroughly discussed during these sessions. The duration of each session should be at least two hours once a month. It should be chaired by the chief resident (elected by the residents of the relevant discipline). Each resident should be given an opportunity to brainstorm all topics included in the course and to generate new ideas regarding the improvement of the course structure

c. Skill Development

Two hours twice a month should be assigned for learning and practicing clinical skills.

List of skills to be learnt during these sessions is as follows:

1. Residents must develop a comprehensive understanding of the indications, contraindications, limitations, complications, techniques, and interpretation of results of those technical procedures integral to the discipline
2. Residents must acquire knowledge of and skill in educating patients about the technique, rationale and ramifications of procedures and in obtaining procedure-specific informed consent. Faculty supervision of residents in their performance is required, and each resident's experience in such procedures must be documented by the program director.
3. Residents must have instruction in the evaluation of medical literature, clinical epidemiology, clinical study design, relative and absolute risks of disease, medical statistics and medical decision-making.
4. Training must include cultural, social, family, behavioral and economic issues, such as confidentiality of information, indications for life support systems, and allocation of limited resources.
5. Residents must be taught the social and economic impact of their decisions on patients, the primary care physician and society. This can be achieved by attending the bioethics lectures and becoming familiar with Project Professionalism Manual such as that of the American Board of Internal Medicine.
6. Residents should have instruction and experience with patient counseling skills and community education.

7. This training should emphasize effective communication techniques for diverse populations, as well as organizational resources useful for patient and community education.
8. Residents may attend the series of lectures on Nuclear Medicine procedures (radionuclide scanning and localization tests and therapy) presented to the Radiology residents.
10. Residents should have experience in the performance of clinical laboratory and radionuclide studies and basic laboratory techniques, including quality control, quality assurance and proficiency standards.
11. Each resident will observe and participate in each of the procedures, preferably done on patients firstly under supervision and then independently.

3. Annual Grand Meeting

Once a year all residents enrolled for MD Nephrology should be invited to the annual meeting at RMU Rawalpindi.
One full day will be allocated to this event. All the chief residents from affiliated institutes will present their annual reports. Issues and concerns related to their relevant courses will be discussed. Feedback should be collected and suggestions should be sought in order to involve residents in decision making. The research work done by residents and their literary work may be displayed. In the evening an informal gathering and dinner can be arranged. This will help in creating a sense of belonging and ownership among students and the faculty.

MD NEPHROLOGY EXAMINATIONS

IN-HOUSE FIRST YEAR EXAMINATION

Year One In Training Examination- Total marks 200		
60% pass marks, written and clinical components have to be passed separately		
Marks Distribution	Topics	No. of Questions
WRITTEN		
	Paper	
MARKS 50	1. Cardiology	1
	2. Nephrology	1
Written- One paper	3.Gastroenterology	1
	4. Respiratory medicine	1
Paper will comprise 10 SAQ, 10 marks each	5.Neurology	1
	6.Emergency medicine	1
1hour duration	7. Endocrinology	1
	8. Dermatology	1
	9. Critical care	1
	10. Rheumatology	1
	Total	10
Up to 10% of the SAQ may not fulfill differentiation		
OSCE- 100 marks		
5 Stations, each of 20 numbers		
60% pass marks, written and clinical components have to be passed separately		

Intermediate Examination MD Nephrology
Total Marks: 300

All candidates admitted in MD Nephrology course shall appear in Intermediate examination at the end of 2nd calendar year.

There shall be one written papers of 150 marks each, clinical, TOACS/OSCE & ORAL of 150 marks.

Distribution of mcqs is as follows

Written Paper 1		Written Paper 2	
Cardiology	15 MCQ	Gastroenterology	15 MCQ
Nephrology	15 MCQ	Neurology	15 MCQ
Infectious disease	10 MCQ	Dermatology	15 MCQ
Respiratory Medicine	10 MCQ	Hematology	10 MCQ
Emergency Medicine	10 MCQ	Endocrinology	10 MCQ
Psychiatry	10 MCQ	Rheumatology	10 MCQ
Critical care	5 MCQ		

Written Examination	=	150 Marks
Clinical, TOACS/OSCE & ORAL	=	150 Marks
Total	=	300 Marks

Written Paper = 150 Marks

Clinical,TOACS/OSCE & ORAL = Total Marks 150

Final Examination MD Nephrology
Total Marks: 800

All candidates admitted in MD course shall appear in Final examination at the end of structured training programme (end of 5th calendar year) and after clearing Intermediate Examination.

There shall be two written papers of 200 marks each, clinical, TOACS/OSCE & ORAL of 500 marks, thesis of 100 marks.

Components of Final Examination

Theory

10 SEQ… 100 MARKS
100 MCQ'S…. 100 MARKS
(pass percentage= 60%)

Only those candidates, who pass in theory papers, will be eligible to appear in the Clinical, TOACS/OSCE & ORAL.

Clinical, TOACS/OSCE & ORAL	**500 Marks**
THESIS	**100 Marks**

All candidates admitted in MD courses shall appear in thesis examination at the end of 5th calendar year of the MD programme. The examination shall include thesis evaluation with defense.

Suggested Reading and Methods of Teaching

FORMATS

To achieve the Training Program's overall goals in providing quality training in patient care, teaching and research, several venues are utilized.

A. One-on-one teaching

This is traditionally the core of the learning process. It is carried out on a daily basis both in the clinical (in-patient and out-patient) and research settings.

B. Guided readings These include the following standard texts of Nephrology as well as material available in the nephrology journals and internet

1. Comprehensive Clinical Nephrology: by Richard J. Johnson and John Feehally 2. "*Clinical Physiology of Acid-Base and Electrolyte Disorders*" by Rose

3. "*Renal Pathophysiology*" by Rose and Rennke.

4. "*UptoDate in Medicine* " Burton D Rose

5. *Handbook of Dialysis by Daugirdas* and Ing

6. *Handbook of Renal Transplantation* by . Danovitch

7.. *Fundamentals of Renal Pathology:* Books: Agnes B. Fogo

8. "*Core Curriculum in Nephrology* " Series of articles published in American Journal of Kidney Disease.

9. "*Nephsap"* series of supplement with Journal of the American Society of Nephrology.

10. Important Nephrology Journals:

Journal of the American Society of Nephrology.

American Journal of Kidney Disease.

American Journal Of Nephrology

American Journal Of Physiology " Renal"

Nephron

Nephrology Dialysis Transplantation

Transplantation

American Journal Of Transplantation

Artificail Organs

Kidney International

Peritoneal Dialysis International

Seminars in Nephrology

Seminars in Diaysis

C. Independent reading Other texts and journals, as well as bibliographic search capabilities is available in the university of Health Sciences library, the department of Nephrology Library and the individual Medical College Libraries.

D. Weekly Conferences:

These weekly conferences will be scheduled by the nephrology department to provide lecture series, clinical and research discussions. These are important forums for the

trainee to develop its presentation skills and confidence as well as interaction with other staff from time to time.

1. Renal Grand Rounds

A weekly hour-long formal seminar. A wide range of mainly clinical topics are presented by the Trainee.

2. Transplant Seminar

A joint seminar series with the Transplant service and Nephrology Service. The subject matter addresses both basic and clinical aspects of transplantation along with case presentations.

3. Nephrology Division Seminars

Formal presentations are given by local as well as invited speakers to the trainees in the main nephrology curriculum. These are a series of lectures given at the beginning of the academic year on dialysis, transplantation and the care of renal emergencies.

4. Radiology Rounds

These are held in the Radiology Department. During these hour-long sessions, radiology reports on active renal patients are reviewed and the findings explained and discussed.

5. Medical Grand Rounds of the department of Medicine

Held at all institutions on a weekly basis.

6. . Dialysis Conference

This meeting is held in the Dialysis Unit and attended by the trainee during the

dialysis rotation, dialysis consultant, dialysis nurses, dietitians. In this meeting, the progress of hemodialysis and peritoneal dialysis patients is reviewed.

7. Journal Club

Important and recent articles published in the nephrology literature to be reviewed and critically discussed by the trainee.

8. Nephrology Division Research Meeting

The 4th and 5th year trainees are required to attend this weekly meeting. Formal presentations of ongoing research work are discussed. This gives the opportunity for the faculty to review its progress and at the same time research ideas and incentive for the trainee.

9. Renal Pathology Conference

The goal is to learn how to interpret renal biopsies and make correlations between the clinical and pathological findings. This forum also provides the trainee to correlate the disease with the pathology and learn from the different views and experiences of the consultants.

10. Clinical Trainees' Conference

To present problem cases in a group meeting that includes the clinical Staff, listen to formal presentations given by the trainee addressing an in depth review of a topic or of recent journal articles. The objective is to become proficient in clinical practice and up to date in the nephrology literature.

E. Teaching

Teaching is a very effective way of learning. As such, the trainees have ample opportunities to teach in the training Program. The trainees are responsible for the daily bedside teaching of medical students and residents attending Nephrology Department Rotations.

Evaluation

Learning goals are established by the attending at the beginning of the rotation and reviewed on a monthly or as needed basis. Face-to-face feedback by the consultant provided at middle of each rotation i. e. at 3 monthly intervals.

Written evaluations: Written evaluations, forms provided by the UHS, of each trainee should be done at the end of each rotation and discussed by the evaluating consultant. This will provide an opportunity to identify weaknesses and strengths. A copy of these evaluations should be provided to the trainee as well as the UHS Education Department.

Attendance of the weekly conferences should be provided to the UHS each month.

Log Book:

A log book should be filled by the trainee and duly signed by the consultant authorizing the performance of the procedure. The log should include the name of the patient, Date of the Procedure, complications and name of the consultant Physician.

Temporary Dialysis Access Catheters:

Femoral:	10
Internal Jugular:	10

Renal Biopsy

Native Kidney Biopsy:	20
Transplanted Kidney Biopsy:	10

Peritoneal Dialysis Catheter:

Acute:	10
Chronic:	5

Continuous Renal Replacement Therapy: 10

Training Plan

COURSE	COMPONENTS	EXAMINATION
FIRST YEAR	06 months in nephrology	Continuous / Formative internal assessment every six monthly (360 degree) In house first year training exam at end of first year training Disease statistics RMU Mandatory workshops
	06 months in internal medicine	
SECOND YEAR	04 months in internal medicine	RMU Mandatory workshops Disease statistics Continuous / Formative internal assessment every six monthly (360 degree)
	08 months of medicine allied rotation of 02 months each	
THIRD YEAR	12 months in nephrology	Continuous / Formative internal assessment every six monthly (360 degree) Synopsis submission

FOURTH YEAR	10 months in nephrology	Continuous / Formative internal assessment every six monthly (360 degree) Thesis data collection and analysis
	01 Months Rotation of ICU	
	01 months in radiology	
FINAL YEAR	10 months in nephrology	Thesis submission atleast 6 months before the end of the taining. At the end of training the trainee will appear in final exit exam
	02 months renal transplant rotation	