Residency Program
Doctor of Medicine (MD)
Curriculum (Phase-B)

Nephrology

Bangabandhu Sheikh Mujib Medical University
Dhaka, Bangladesh
Residency Program

1. Introduction:
Renal Medicine or Nephrology is the medical speciality that involves the care of patients with all forms of diseases of kidney, Ureter, Urinary bladder & Urethra. This includes treatment of patients with:

- Kidney disease without impairment of excretory kidney function (e.g. proteinuria, haematuria, recurrent urinary tract infection and kidney stone disease), acute kidney injury or chronic kidney disease,
- Conditions that primarily or solely affect the kidney (such as some forms of glomerulonephritis);
- Disorders which affect the kidney as part of a multi-system disease (such as diabetic nephropathy);
- Disorders that are linked to changes or abnormalities in renal physiology (such as acid base disturbances).
- End-stage kidney disease (i.e. patients with a kidney transplant, receiving any form of dialysis, or undergoing active supportive treatment of kidney failure).

Most important part of this service involves the early detection of kidney disease, the prevention and management of progressive kidney disease, and the management of complications developed as a result of kidney disease. However, kidney disease is a long-term condition for many patients, and can impact on all aspects of life. The care, support and treatment of patients with end-stage kidney failure are important aspects of Renal Medicine. A coordinated approach is required to ensure that nutritional, lifestyle, social and psychological needs are met alongside the physical needs of patients. The complexity of renal healthcare requires integrated multi-professional working group to provide a high quality service.
2. Rationale:
A Renal Physician has specialist knowledge of Renal Medicine and the knowledge, skills and attributes to manage all aspects of acute kidney injury, chronic kidney disease, different types of kidney disease including GN, UTI Hereditary diseases of kidney and end stage kidney disease (including dialysis and renal transplantation). HTN, DM Renal physicians provide a wide range of clinical services, including prevention of CKD, for patients with kidney disease in a variety of clinical settings including:
- In-patient and out-patients hospital settings, and outreach settings closer to the patient’s home.
- Dialysis units.
- Other specialist units and hospitals, particularly Intensive Care, Cardiothoracic, Trauma, Liver and Vascular Units where acute kidney injury is common.
Renal physicians work closely with colleagues in many other specialties for example:
- Urologists managing patients with renal stone disease etc.
- Diabetologists managing patients with diabetic nephropathy & diabetic CKD patients in whom renal problems are common.
- Obstetricians managing pregnancy complicated by CKD, glomerulonephritis & AKI due to obstetric cause.
- Dermatologists dealing with dermatological problem in CKD, skin problems following renal transplantation etc.
Renal physicians generally work in renal units based in District Hospitals, Medical college University Teaching Hospitals or in few private hospital and clinic. The renal services provided in these four types of hospital are broadly similar, with the exception that renal transplantation mostly takes place in University Teaching Hospitals, in specialized hospital. Many renal units also provide care in satellite haemodialysis units, either in other hospitals, independent treatment centers or in community-based facilities.
Renal physicians may to perform practical procedures in support of their units’ services to patients depending on the skill mix of the multidisciplinary team.
These include diagnostic procedures such as renal biopsy and ultrasound of the renal tract and procedures related to establishing vascular or peritoneal access for the delivery of dialysis treatment. Renal physicians need to be fully trained in the indications for and management of complications related to these procedures.
Renal physicians deliver effective patient-focused care for patients with kidney disease throughout the patient journey from diagnosis to end-of-life care. This enhances patient care and facilitates high quality complex long-term decision making. The service they give to patients depends on close collaboration with colleagues in primary care, in the renal multi-professional team and in other services. Their role involves leadership in many fields particularly in development and provision of renal services.
Renal physicians are engaged in clinical governance, are effective leaders, educators of patients and colleagues and appreciate the role of research in delivering high quality patient care.

3. Aims and Objectives:
The Program aims at training a physician in the specialty of Nephrology encompassing the related knowledge, skills, research methodology and attitudes which will enable him/her to function as an independent clinician/consultant, a teacher or a research scientist.
During the period of training the candidate is expected
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1. To acquaint himself/herself with the past and current literature on relevant aspects of basic, investigative and clinical nephrology.
2. To acquire performance skills for diagnostic and therapeutic procedures and interventions.
3. To diagnose, plan and interpret investigations and treat various acute and chronic kidney ailments by relevant therapeutic methods.
4. To identify, frame and carry out research proposals in the specialty.
5. To acquire thorough knowledge of internal medicine and allied general and clinical disciplines to ensure appropriate and timely referrals.
6. To acquaint with relevant education delivery system to be able to function as a health educator.

4. Admission Requirements for Phase B Training:
A. Residents who have successfully passed Phase A Final Examination in Medicine and Allied are eligible for enrolment in the Phase B Program.
B. Candidates with FCPS / MD in Internal Medicine can be enrolled directly into Phase B Program.

5. Content (Syllabus) Outline: Detail in Section 11:
5.1. Phase B Training Rotation (Annexure-1)

Total duration - 36 months
- Out of which 33 months will be left for training – learning and thesis completion.
  - Will be divided into 6 months blocks
  - EOBA at the end of each block
  - Thesis should be completed before registration for Phase B examination.

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At the end of each block 10 days for exam preparation (3x10=30 days) 1 months and remaining 2 months for thesis at the end of last block, total 3 months

5.2. Rotation
Each candidate will go through the following rotations in various areas/subspecialties of nephrology during 3 years of training in Nephrology.
During this period, the candidate will complete his on-going research projects and would also familiarize himself/herself with research methodologies with laboratory techniques being carried out in HLA lab, immunofluorescence laboratories and also with routine laboratory investigations being done in the Renal Lab.
Clinical training schedule will include the following:
  - Attending lecture class - weekly Sunday
  - Bedside rounds – daily
  - Mortality meeting - once a week
  - Seminar - once in two weeks
  - Grand rounds - once a week
  - Journal club - once in two weeks
  - Renal histology conference - once in two weeks
  - Clinical case discussion - once a week
  - Transplant meeting - once a week
  - Nephro-urology conference - once a week
  - Nephro-radiology conference - once a week
  - Out patient nephrology care including renal transplant clinic

5.3 Training
5.3.1 Didactic Lecture
A minimum of 15-20 lectures/year covering the recent advances in all aspects of renal diseases would be delivered
by consultant faculty. In addition, candidates will be required to attend the complete, short term basic and clinical courses on
1. Bio-statistics
2. Research methodology and experimental lab medicine relevant to Nephrology
3. Use of Computers in Medicine
4. Bio ethics, ethical issues in transplantation including “Human Organ Transplant Act”

5.3.2 Interventional Procedures
A candidate will be required to have achieved proficiency in performing and supervising hemodialysis, peritoneal dialysis and renal biopsies. He would be expected to have performed a minimum of 30 renal biopsies, 100 hemodialysis including CVVHD, CRRT and 5 peritoneal dialysis. The candidate would be expected to involve and be trained in all aspects of CAPD Program. The candidate would also be expected to have inserted at least 25 internal jugular, 35 femoral and 5 subclavian vascular access catheters. The candidate would maintain record of all the procedures/ interventions in a log book, which would be certified by the Head of the department. A proficiency certificate from the head of the department regarding the clinical competence and skillful performance of procedures by the candidate will be necessary before he would be allowed to appear in the examination. Six monthly internal assessment would be done to monitor and evaluate the training in various areas/ subspecialties of Nephrology.

5.3.3 Investigative work-up
The candidate is expected to perform routine urine examination and ultrasonography. In addition he/she must familiarize himself/herself with the following investigations:

Laboratory:
• Electrolyte and acid base analysis
• Renal function tests
• Auto analyzer functioning
• Renal pathology interpretation including immuno-fluorescence and electron microscopy.

Radiological:
• Intravenous urography
• Micturating cystourethrogram
• Digital subtraction angiography
• Selective renal angiography and interventional angioplasty and stenting
• Selective renal venography
• Doppler studies
• Antegrade and retrograde pyelography
• CT imaging
• Magnetic resonance imaging MRA.

Nuclear Medicine:
• Various renal isotope imaging and functional techniques
• Urodynamic studies

Microbiology:
• Viral, Bacterial Protozoal and fungal cultures, Serological and PCR techniques

Immunological test:
• ANCA, ANA, anti DsDNA, complement, anit GBM ab, cryoglobulin, immuneelectrophoresis

Tissue typing:
• Cross match, serological typing, molecular HLA typing; PRA

Renal function testing
• Renal plasma flow, GFR, CCR.
• Renal concentrating, diluting capacity
• Micro albuminuria
• Proteinuria measurement
• Urinary acidification
• Renal sodium and potassium handling
6. Teaching and Learning:
1. Training will be exclusively on whole time in-service basis on the residency pattern.
2. The Program will impart a sound training in the diagnosis and management of patients with renal disorders. During the training period, the candidate shall take part in all the activities of the department including inpatient and outpatient nephrology care, laboratory and investigative work up, lectures, seminars, conferences, group discussions and various other clinical and teaching Program.
3. The candidate will work as a member of the renal team and will be given the
4. Responsibility of investigation and therapeutic care of all patients under the direct guidance of the consultants in Nephrology. He will be first on call for routine and emergency renal consultants.

7. Record of Training:
- Logbook
- Portfolio
- Administrative records

a) Logbook
- Divided into blocks
- There should be a checklist at the end of each segment representing a block
  - Individuals items on the checklist should be signed by the trainer on the day of the performance and graded where appropriate

b) Portfolio:
- Contents of a Portfolio for Each Block
  - Best care record
  - Best referral note
  - Best referral reply
  - Best discharge summary
  - Best round note/procedure note
  - At least one assignment
  - At least one presentation

- Additional contents of a Portfolio for Entire Phase
  - Case report
  - At least one from each type assignments
  - At least one from each presentations
  - A contribution to the department/university/community/science
  - Audio record of a patient education/communication
  - One research report

i) Assignments
- Reflective case study
- Problem solving exercise
- Quality care plan

ii) Presentations
- Clinical meetings
- Journal clubs
- Grand round
- Clinico-pathological conference
- Lectures in classes, seminars, symposia, CPD
- Teaching presentation of the junior resident

8. Research:
Each candidate will be required to undertake research under the guidance of the Professor/Associate. They will be required
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to submit a research plan within 3 months after joining the course and submit the thesis before registration of Phase B final exam. In addition the candidate will participate in all the departmental research activities.

9. Assessment:
The assessment for certification of the MD degree of the University is comprehensive, integrated and phase-centered attempting to identify attributes expected of specialists for independent practice and lifelong learning and covers cognitive, psychomotor and affective domains. It keeps strict reference to the components, the contents, the competencies and the criteria laid down in the curriculum. Assessment includes both Formative Assessment and Summative (Phase final) Examinations.

9.1. Formative Assessment:
Formative assessment will be conducted throughout the training phases. It will be carried out for tracking the progress of residents, providing feedback, and preparing them for final assessment (Phase completion exams).
There will be Continuous (day-to-day) and Periodic type of formative assessment.

- **Continuous (day-to-day) formative assessment** in classroom and workplace settings provides guide to a resident's learning and a faculty's teaching / learning strategies to ensure formative lesson / training outcomes.
- **Periodic formative assessment** is quasi-formal and is directed to assessing the outcome of a block placement or academic module completion. It is held at the end of Block Placement and Academic Module Completion. The contents of such examinations include Block Units of the Training Curriculum and Academic Module Units of the Academic Curriculum.

9.1.1. **End of Block Assessment (EBA):**
End of Block Assessment (EBA) is a periodic formative assessment and is undertaken after completion of each training block, assessing knowledge, skills and attitude of the residents. Components of EBA are written examination, structured clinical Assessment (SCA), medical record review, and logbook assessment. Unsatisfactory block training must be satisfactorily completed to be eligible for phase final examination.

9.1.2. Formative assessment for Academic modules for Biostatics and Research Methodology and Medical Education to be done in the first nine months of Phase B training. Residents getting unsatisfactory grade must achieve satisfactory grade by appearing the re-evaluation examination to be eligible for the Phase B Final Examination.

9.2. **Summative Examination:**
Assessment will be done in two broad compartments.

a) **Compartment A:** Consist of 3 (three) components.
1. Written Examination (Consisting of 2 papers).
2. Clinical Examination (One long and four short cases).
3. SCA and Oral (10 stations SCA, Oral one board consisting of 2 examiners).
Every Resident must pass all the 3 components of compartment-A separately. Candidates will be declared failed if he/she fails in one or more component(s) of the examination. He/she then have to appear all the 3 components in the next Phase B Final Examination.

b) **Compartment B**: Thesis and Thesis defense.

9.2.1. Written Examination:

Two Papers: Contents of written papers listed in Annexure II

Question type and marks:

- Two Papers (Paper I and Paper II); 100 marks each; Time 3 hrs for each paper. Pass marks-60% of total of 2 papers.
- Each paper will consist of Two Groups:
  - **Group A**:
    - 10 short questions (5 marks each)
    - These will assess the knowledge of different level and its application
  - **Group B**:
    - 5 scenario based problem solving questions (10 marks for each).
    - The questions should focus to assess the capability of handling clinical problem independently and comprehensively as a specialist.
    - Suggested format:
      - A scenario followed by question(s).
      - Questions may include diagnosis, differential diagnosis, investigation plan, treatment, follow up and patient education.

9.2.2. Clinical Examination: Long case and Short case:

- There will be one long case and four short cases.

i) Long case: Marks-100
   - Directly observed
   - Two examiners for each examinee.
   - History taking and examination by the examinee – 30min.
   - Discussion on the case 20 min.(presentation 6min, crossing 6x2min and decision 2min).
   - Examiners will not ask any question nor stop the examinee in any way during history taking and physical examinations.
   - Discussion should be done preferably as per structured format and proper weightage on different segments of clinical skills.

ii) Short cases: Marks-100
   - Four in number
   - Time 20-30 min. (Time will be equally divided for each short case)
   - Crossing should be done with proper weightage on different segment of clinical skills.

iii) Pass marks: 60% of total of Long and Short Cases

9.2.3. Structured Clinical Assessment (SCA): Marks-100
   - 10 stations : 5 min each

9.2.4. Oral Examination: Marks-100
   - One board consisting of 2 examiners.
   - 20 minutes (9+9+2).

9.2.5. Pass marks in SCA and Oral: 60% of total (SCA and Oral.)

9.3. Thesis Evaluation:

- Marks: Thesis writing-200; Defense-100: Marks for acceptance-60% of total.
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- To be evaluated by 3 (three) evaluators: 2 subject specialists and one academician preferably involved in research and teaching research methodology.
- Among the subject specialists one should be external.
- Evaluators should be in the rank of Professor/Associate Professor.
- Supervisor will attend the defense as an observer and may interact only when requested by the evaluators.
- Thesis must be submitted to the controller of Exam not later than 27 months of enrolment in Phase-B.
- Thesis must be sent to the evaluators 2 (Two) weeks prior to assessment date.
- Evaluation will cover Thesis writing and its defense.
- For thesis writing evaluator will mark on its structure, content, flow, scientific value, cohesion, etc.
- For defense – Candidate is expected to defend, justify and relate the work and its findings.
- Assessment must be completed in next 3 months.
- Outcome of the assessment shall be in 4 categories – “Accepted”, “Accepted with minor correction”, “Accepted with major correction” and “Not Accepted”.

9.3.1. Description of terms:
- Accepted: Assessors will sign the document and resident will bind it and submit to the Controller of Examinations by 10 days of the examination.
- Accepted with minor correction: Minor correction shall include small inclusion/exclusion of section; identified missing references, correction of references and typographical and language problem. This should be corrected and submitted within 2 weeks.
- Accepted with major correction: Task is completed as per protocol with acceptable method but some re-analysis of result and corresponding discussion are to be modified.
- To be corrected, confirmed by Supervisor and submit within 3 (Three) weeks.
- Not Accepted: When work is not done as per protocol or method was faulty or require further inclusion or confirmation of study.
- To complete the suggested deficiencies and reappear in defense examination during its next Phase Final Examination.
- Candidate has to submit his/her thesis and sit for examination and pay usual examination fees for the examination.

9.3.2. Residents must submit and appear Thesis defense at notified date and time. However non-acceptance of the Thesis does not bar the resident in appearing the written, clinical and oral exam.

9.4. Qualifying for MD/MS Degree:
On passing both the compartments, the candidate will be conferred the degree of MD/MS in the respective discipline. If any candidate fails in one compartment he/she will appear in that compartment only in the subsequent Phase-B exam.

10. Trainee supervision, feedback & Monitoring:
This section of the curriculum describes how trainees will be supervised, and how they will receive feedback on performance. The learning portfolio for physicians in training outlines the mechanisms for supervision and appraisal in more detail.
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10.1. Supervision
All training in nephrology should be conducted in institutions with appropriate standards of clinical governance and that meet the relevant Health and Safety standards for clinical areas. Trainees must work with a level of clinical supervision commensurate with their clinical experience and level of competence. This is the responsibility of the relevant clinical manager and supervisor after discussion with the trainee’s Educational Supervisor and the designated clinical governance lead. In keeping with the principles of Good Medical Practice, trainees should know that they must limit their clinical practice to the level of their clinical competence and should seek help and support without hesitation. The Educational Supervisor, when meeting with the trainee, should discuss issues of clinical governance, risk management and any report of any untoward clinical incidents involving the trainee. The Educational Supervisor should be part of the clinical specialty team. Thus if the clinical directorate (clinical director) have any concerns about the performance of the trainee, or there were issues of doctor or patient safety, these would be discussed with the Educational Supervisor. These processes, which are integral to trainee development, must not detract from the statutory duty of the trust to deliver effective clinical governance through its management systems.

10.2. Feedback
Frequent and timely feedback on performance is essential for successful work-based experiential learning. To train as a physician, a doctor must develop the ability to seek and respond to feedback on clinical practice from a range of individuals to meet the requirements of Good Medical Practice and revalidation.

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The local education faculty will establish clear processes for feedback, with close Liaison with designated Educational Supervisors.

10.3. Monitoring
A. Logbook:
B. Portfolio:
C. POMR focused assessment:
- Randomly one POMR will be drawn from each resident’s collection & will hand over to the next resident to comment on individual section or a selected section of the POMR. Supervisor will make observation later.
- There will be two marks, one for the resident who filled the POMR and other from the assessment standard of the assessing resident. Marks may be divided into 80% and 20% respectively.

E. Written examination mark
D. Clinical/Practical examination Mark
Preparation and Flow of Educational and Training Reports
A. Supervisor (Educational and Training):
Prepare
- End of Block Assessment Report (EBAR): Resident’s educational, training, and competency assessment/rating
- Send the reports to the Course Manager (of the Parent Discipline)

B. Course Manager:
Prepare
- Block Report (BR): Events report involving the Resident during the block period
- Year-wise Academic Report (YAR): Compiling BR
- Year Completion Report (YCR): Compiling EBAR
- Send the reports to the Course Coordinator
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C. Course Coordinator:
Prepare-
   - Phase-wise Academic Report (PAR): Compiling YAR
   - Phase Completion Report (PCR): Compiling YCR
• Send the reports to the Course Director

D. Course Director:
• Endorse-
   - Residents' Phase Completion Reports (PCR)
• Report to the Dean

INSTRUCTION TO SUPERVISOR
The supervisor should countersign the logbook at the end of every session of teaching. This will include the following:
1. Lectures
2. Clinical class
3. Case presentation in meeting, grand / ward round
4. Case records (POMR)
5. OPD consultation
6. Emergency encountered
7. Journal club
8. Independent study
10. Interpretation of lab data and investigation report.
   The logbook should also be filed after every in-course periodic assessment, efficiencies in training should be recognized from the entries in the logbook (both theoretical and practical) and appropriate steps should be taken to overcome them.

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Guidelines for End of Block Assessment

1. End of Block Assessment:
   - All the components of the End of Block Assessment will be organized and managed by the respective Course Coordinators as per guidelines
   - Parent Course Coordinators are requested to collect and compile the assessment reports of the components of Composite Block(s) from the respective training departments
   - Assessment is to be completed within the last 7 days of the block period

2. Reporting and Feedback:
End of Block Assessment Report and the Block report (Formats attached) must be completed within 7 days after the completion and be sent to the parent Course Coordinator/Year Manager. Debriefing/feedback on Block activities/performance should be provided to the Residents following assessment before they leave the training department. Course Coordinators are requested to submit a copy of the Block Report to the Course Director.

End of Block Assessment Report
1. End of Block Assessment
   • Formative assessment at the end of each block.
   • End of Block assessment will be organized by the Course Coordinators
   • Assessment, is to be completed within the last 7 days of each block
   • Report must be completed within 7 days after Block Completion and be preserved by the Parent Course - coordinator.

Performance should be provided to the Residents following assessment before they leave the training Department/Service.
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Constructive feedback should be provided throughout training in both formal and informal settings. Opportunities for feedback will arise during appraisal meetings, when trainees are undergoing workplace-based assessments, in the workplace setting, and through discussions with supervisors, trainers, assessors and those within the team.

11. Detailed content of Learning:

Syllabus
Applied basic sciences knowledge relevant to the field of nephrology including electrolyte and acid base disorders. Investigative techniques, selection and interpretation of results. Pathogenesis of renal diseases and renal histopathology. Diseases of the urinary tract (glomerular diseases, urinary tract infection, tubulointerstitial diseases, inherited diseases, toxic nephropathies, systemic diseases with renal involvement, renal stone disease, urinary tract obstruction, vascular diseases of kidney, hypertension, neoplasia etc). Renal failure (diagnosis and medical management)
Principles and practice of dialysis
Renal transplantation
Recent advances in nephrology
Biostatistics and clinical epidemiology
Ethics, psychosocial, economics of management of renal diseases, human organ transplant act and medicolegal aspects of transplantation.

12. Curriculum Implementation Strategies:
A Medical Education unit (MEU) should be established to provide logistic and technical support for proper implementation of the curriculum and better educational environment.

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This unit in turn will support the following areas:
- Developing study skill rooms
- Audiovisual accessories
- Effective and appropriate media selection and development
- Preparing lesson plan for each session
- Developing academic calendar
- Preparing effective methods for respective individual teaching learning session
- Faculty development
- Staff training
- For better assessment
  - Selecting and developing valid and reliable assessment tools with model answers when needed
  - Development of question bank

13. Curriculum review:
- Ongoing monitoring should be done for proper implementation of curriculum through checklist, questionnaire and form both formal and informal feedback from the trainer, trainees and other stakeholders
- Course evaluation should be done for further improvement of the curriculum continuously.
## Clinical Training Rotations (Blocks):

### Block-1

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<tr>
<th>Months</th>
<th>1&lt;sup&gt;st&lt;/sup&gt;</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt;</th>
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<tbody>
<tr>
<td><strong>Educational Program</strong></td>
<td>Normal Anatomy, Physiology and Metabolism of Kidney, The Kidney and Endocrine system. Basic Courses on Biostatistics, Research Methodology, Basics of Medical Education.</td>
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<tr>
<td><strong>Clinical Training Rotations</strong></td>
<td>Clinical Nephrology (Nephrology ward Unit placement, Unit Round, Grand Round, Morning Session, Nephrology Referral, Managing Renal Emergency, Intervention Nephrology-Obsidian)</td>
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<tr>
<td><strong>Thesis Work</strong></td>
<td>Protocol development/ Submission/ IRB clearance</td>
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<tr>
<td><strong>Educational Program</strong></td>
<td>Clinical Physiology of Fluid and Electrolyte Metabolism, Cardinal Manifestations of Renal Diseases, Renal Immunopathology.</td>
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<tr>
<td><strong>Clinical Training Rotations</strong></td>
<td>Dialysis Unit (Haemodialysis, IPD, CAPD), Intervention Nephrology - Hands on training.</td>
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<tr>
<td><strong>Thesis Work</strong></td>
<td>Patient enrolment, intervention and data collection</td>
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<tr>
<td><strong>Educational Program</strong></td>
<td>Diseases of Kidney and Urinary tract, Hypertension, Uremia and the effect of Dialysis.</td>
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<tr>
<td><strong>Clinical Training Rotations</strong></td>
<td>Kidney Transplantation (Coordination, Counseling, Medico legal aspect preparation of Donor and Recipient, Management, Follow-up, Intervention Nephrology - Hands on training).</td>
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<tr>
<td><strong>Thesis Work</strong></td>
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<tr>
<td><strong>Educational Program</strong></td>
<td>Management of Uremic State, Renal Transplantation, Clinical Procedure and technique.</td>
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<tr>
<td><strong>Clinical Training Rotations</strong></td>
<td>Clinical Nephrology (Nephrology ward Unit placement, Unit Round, Grand Round, Morning Session, Nephrology Referral, Managing Renal Emergency, Intervention Nephrology - Hands on training).</td>
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<tr>
<td><strong>Thesis Work</strong></td>
<td>Patient enrolment, intervention and data collection</td>
<td>Thesis updates (Raw data presentation).</td>
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<th>Months</th>
<th>25&lt;sup&gt;th&lt;/sup&gt;</th>
<th>26&lt;sup&gt;th&lt;/sup&gt;</th>
<th>27&lt;sup&gt;th&lt;/sup&gt;</th>
<th>28&lt;sup&gt;th&lt;/sup&gt;</th>
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<tbody>
<tr>
<td><strong>Educational Program</strong></td>
<td>Lab Procedures and Techniques, Radiology &amp; Imaging, Radiographic and radionuclear techniques, Use of Radiopharmaceuticals in Renal Medicine End care life management.</td>
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<tr>
<td><strong>Clinical Training Rotations</strong></td>
<td>Clinical Nephrology (Nephrology ward Unit placement, Unit Round, Grand Round, Morning Session, Nephrology Referral, Managing Renal Emergency, Intervention Nephrology Hands on training).</td>
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<tr>
<td><strong>Thesis Work</strong></td>
<td>Data processing and analysis</td>
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### Block-6

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<th>36&lt;sup&gt;th&lt;/sup&gt;</th>
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<tbody>
<tr>
<td><strong>Educational Program</strong></td>
<td>Genetics, Molecular biology and Cloning of Kidney.</td>
<td>Eligibility Assessment and Phase B Final Examination</td>
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<tr>
<td><strong>Clinical Training Rotations</strong></td>
<td>OPD (GN Clinic, HTN Clinic, DN clinic, LN clinic, Transplant and Dialysis follow-up)</td>
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<tr>
<td><strong>Thesis Work</strong></td>
<td>Report writing and submission</td>
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</table>
Annexure-2

Contents of Written Papers

Contents of paper-1

Group -A
1. Acute Kidney Injury [AKI].
2. Chronic Kidney Injury [CKD].
3. Glomerulonephritis [GN].
4. Nephrotic Syndrome [NS].
5. Asymptomatic proteinuria.
6. Isolated haematuria.
7. Tubulointerstitial nephritis [IN].
8. Diabetic Nephropathy [DN].
9. Hypertension and kidney.
12. Connective tissue disease kidney.
15. Paraproteinemina and kidney.
17. Multisystem disease and kidney.

Group- B
1. Fluid, Electrolytes & trace element.
2. Kidney and Gout.
3. Renal osteodystrophy.
4. Drugs & Nephropathy.
5. Urinary tract infection (UTI).
6. Urinary tract obstruction.
7. Renal stone disease.
8. Renal Tubular acidosis.
9. Renovascular Hypertension.

Contents of paper-2

Group -A
Renal Emergency
1. Electrolyte Imbalance.
3. Acute Pulmonary Oedema.
4. Uncontrolled Hypertension.
5. Uncontrolled DM including DKA & HONK.
6. Acute Uraemic Syndrome.
7. Immediate complications of Vascular access.

Dialysis Medicine
1. Renal Replacement Therapy (RRT).
2. Haemodialysis (Conventional, SLED, CRRT) haemoperfusion & plasmapheresis.
3. IPD & CAPD.
5. Haemodialysis & CAPD Apparatus.

Transplantation Medicine
1. Pre transplant evaluation of Donor & Recipient
2. Transplant Immunology (Tissue typing, Cross Matching)
4. Post Transplant complications.
5. Ethics in transplantation.

Group B
1. Surgical aspect of kidney Transplantation & Renal preservation.
3. Physiological principal & urea kinetic modeling of haemodialysis.
Residency Program

4. Lab procedure & Techniques.
5. Radionuclear & Radiographic techniques.
6. Intervention Nephrology.
7. Anticoagulation in dialysis.
10. Special problem in dialysis patient.
11. Immuno suppressive drug in transplantation.
12. Live Related cadaveric transplantation.

Annexure-3

Suggested Books And Journals
Following books and journals are suggested for reading. Latest edition should be made available in central/departmental library.
1. The Kidney Brenner and Rector
2. Diseases of kidney and urinary tract Schrier and Gottschalk
3. Heptinstall’s Pathology of the kidney J Charles Jennets
5. Kidney Transplantation Peter Morris
6. Oxford Text Book of Nephrology Alex davision, Stewart Cameron et al
7. Massry and Glassock’s Text Book of Nephrology Saul G Massry and RJ Glassock
8. The Kidney: Physiology and Pathophysiology DW Seldin and G Giebisch
10. Immunological Renal Diseases EG Neilson and WG Couser

Journals
1. American Journal of Nephrology
2. Kidney International
3. American Journal of Kidney Diseases
4. Nephrology Dialysis and Transplantation
5. Journal of American Society of Nephrology
6. Seminars' in Nephrology
7. Indian Journal of Nephrology
8. Electronic edition of Uptodate in Nephrology and Hypertension
9. Current opinion in Nephrology and Hypertension
10. New England J of Medicine
11. New England J of Medicine
12. Lancet

Annexure-4

The Model of Learning
This section describes the model of learning appropriate to Nephrology.
Trainees will achieve the competencies described in the curriculum through a variety of learning methods. There will be a balance of different modes of learning from formal teaching Programs to experiential learning 'on the job'. The proportion of time allocated to different learning methods may vary depending on the nature of the placement within a rotation.
There must be robust arrangements for quality assurance in place to ensure consistent implementation of the curriculum.

Work-Based Experiential Learning - The content of work-based experiential learning includes active participation in:
- Out patient clinics, including general nephrology
clinics, renal transplant clinics, haemodialysis clinics, peritoneal dialysis clinics, pre-dialysis clinics and subspecialty clinics such as vasculitis clinics. Trainees will assess 'new' and 'follow-up' patients and present their findings to their clinical supervisor. The degree of responsibility taken by the trainee will increase as competency in nephrology increases.

- **Personal ward rounds and provision of ongoing clinical care** on renal, dialysis and renal transplant ward attachments. Every patient seen, on the ward or in outpatients, provides a learning opportunity, which will be enhanced by following the patient through the course of their illness: the experience of the evolution of patients’ problems over time is a critical part both of the diagnostic process as well as management. Patients seen should provide the basis for critical reading and reflection of clinical problems.

- **Unit chief-led ward rounds.** Every time a trainee observes another doctor, consultant or fellow trainee, seeing a patient or their relatives there is an opportunity for learning. Ward rounds should be led by a consultant and include feedback on clinical and decision-making skills.

- **Transplant Unit rounds.** Personal and consultant-led ward rounds in hospital or satellite dialysis units provide important additional learning opportunities.

- **Renal referrals.** Assessment of patients referred to the renal medicine team from other specialties, including from the acute medical take, provides invaluable learning opportunities.

- **Procedural teaching.** As competence in specific procedural skills is gained, the level of supervision will decrease until independent practice is achieved. Assessment of progress will involve workplace-based assessment (DOPS, direct observation of procedural skills). Trainees would be expected to teach and supervise procedural skills in which they themselves are competent, to Foundation, Core Medical, and other Nephrology trainees.

- **Multi-disciplinary team meetings.** There are many situations where clinical problems are discussed with clinicians in other disciplines. These provide excellent opportunities for observation of clinical reasoning.

- **Specialist provision of clinical care** for patients with acute renal failure or renal disease in Intensive Care Units and High Dependency Units.

Each local faculty for education will define the Program of learning activities. Trainees have supervised responsibility for the care of in-patients. This includes day- to-day review of clinical conditions, note keeping, and the initial management of the acutely ill patient with referral to and liaison with clinical colleagues as necessary. The degree of responsibility taken by the trainee will increase as competency in nephrology. There should be appropriate levels of clinical supervision throughout training with increasing clinical independence and responsibility as learning outcomes are achieved.

**Formal Postgraduate Teaching** – The content of these sessions are determined by the local faculty of medicine and will be based on the curriculum. There are many opportunities throughout the year for formal teaching in the local postgraduate teaching sessions and at regional, national and international meetings.

Suggested activities include:

- A Program of formal bleep-free regular teaching sessions in nephrology
- Case presentations
- Research and audit projects
Residency Program

- Journal clubs
- Lectures and small group teaching
- Grand rounds
- Clinical skills demonstrations and teaching
- Critical appraisal and evidence based medicine and journal clubs
- Joint specialty meetings e.g., radiology, pathology, rheumatology, diabetology and cardiology
- Bedside teaching. This may be timetabled or ad hoc teaching.
- Attendance at regional, national and international meetings in nephrology, such as the Bangladesh Renal Association Annual Congress.

Independent Self-Directed Learning - Trainees will use this time in a variety of<br>ways depending upon their stage of learning. Suggested activities include:
- Preparation for assessment and examinations
- Reading journals
- Reading, including web-based material
- Maintenance of personal portfolio (self-assessment, reflective learning, personal development plan)
- Audit and research projects
- Achieving personal learning goals beyond the essential, core curriculum

Learning Experiences
This section identifies the types of situations in which a trainee will learn.

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Residency Program

Learning from Practice - Trainees will spend a large proportion of work-based experiential learning involved in supervised clinical practice in hospital settings. Learning will involve closely supervised clinical practice until competences are achieved. The learning environment will be in renal wards, renal transplant units and, haemodialysis units, peritoneal dialysis units, and critical care environments and outpatient clinics. Opportunities for informal and formal feedback on performance should occur during and at the end of clinical sessions.

Learning with Peers - There are many opportunities for trainees to learn with their peers. Local postgraduate teaching opportunities allow trainees of varied levels of experience to come together for small group learning. Examination preparation encourages the formation of self-help groups and learning sets.

Clinical training curriculum:
Patient Care: History Taking Resident Competency Evaluation Form,

<table>
<thead>
<tr>
<th>Demonstrates the ability to obtain and document an accurate and complete history from patient, caretaker or outside resources with moderate input from faculty. Specific historical areas include:</th>
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<tbody>
<tr>
<td>Risk factors for ARF</td>
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<tr>
<td>Nephrotoxic drugs</td>
</tr>
<tr>
<td>Drugs requiring dosing adjustment in renal failure</td>
</tr>
<tr>
<td>Etiology of CRF</td>
</tr>
<tr>
<td>Transplant history</td>
</tr>
</tbody>
</table>

resources with occasional input from faculty. Begins to deal with sensitive topics such as:
- Compliance/adherence issues
- Substance abuse
Residency Program  Nephrology

- End of life issues in dialysis patients
  Demonstrates the ability to obtain and document an accurate and complete history from patient, caretaker or outside resources independently.
  Successfully deals with sensitive topics.
  Provides feedback to junior team members on their history taking skills.

Patient Care: Physical Exam Resident Competency Evaluation Form,

Demonstrates the ability to perform a routine exam for:
- Volume status
- pericarditis
- Assessment of vascular access for appropriate bruit and signs of infection
- Exam of renal allograft (size, location and tenderness)
Attempts to characterize abnormalities on exam with regular input from faculty

Demonstrates the ability to recognize abnormalities on the physical exam and appropriately characterize:
Requires regular input from faculty.

Independently carries out an accurate physical examination with both normal and abnormal physical findings

Patient care: Medical Decision Methods: Resident Competency Evaluation Form, Chart

Review/documentation

Reliably recognizes critical illness and appropriately seeks assistance.
Writes progress notes that identify important data and demonstrate thoughtful problem based assessment and plan.
Initiates diagnostic testing for:

Residency Program  Nephrology

- Sodium disorders
- Hypokalemia and hyperkalemia
- Acute renal failure
- Calcium and phosphate disorders
- Metabolic acidosis and alkalosis
Identifies reasons for urgent dialysis
Interprets drug levels and adjusts appropriately for renal function
Can acutely manage a patient with hyperkalemia

Reliably recognizes critical illness and can independently initiate management strategies. Management goals are correct with moderate faculty input.
 Appropriately analyzes diagnostic tests as described in the PGY-1 year.
 Begins to reliably manage all electrolyte disturbances

Reliably recognizes critical illness and can independently initiate emergent and ongoing management strategies.

Patient Care: Procedural skills Methods: Resident Competency Evaluation Form, Procedure Log

Masters cognitive, counseling and technical skills for:
- Central line placement in at least one site
- Foley catheter placement
Interprets results of:
- Urinalysis
- Urine culture and sensitivity
Understands the indications for:
- Renal ultrasound
- catheter placement
Documents appropriately
Relies on moderate faculty input.

Masters cognitive, counseling and technical skills for:
Central line placement for both IJ and subclavian
**Residency Program**

**Nephrology**

Interprets study reports:
- Renal ultrasound with regard to renal size and evidence or cysts/obstruction
- Renal biopsy with regard to distinguishing between glomerular and no glomerular disease
Relies on occasional faculty input

Independent in performing, interpreting and planning appropriate procedures for patients with renal disease.

**Patient Care: Consultation Process Methods: Resident Competency Evaluation Form**

Clarify questions to be answered. Thorough data gathering in providing consults.

Develops strategy for managing patient referrals and follow-up.

Is an effective consultant.

Consultation provided with EBM literature review.

**Medical Knowledge Methods: Resident Competency Evaluation Form, Attd Review of Written Documentation**

Applies relevant clinical and basic science knowledge in the following common medical conditions:
- Acid Base Disorders
- Fluid and electrolyte disorders
- Acute and chronic renal failure
- Indications for emergent dialysis
- Evaluation for transplant
- Basics of immunosuppressive therapy

Demonstrates a progression in content knowledge and analytical thinking with well formulated differential diagnoses and management plans.

Understanding and application of medical literature related to common medical conditions.

**Residency Program**

**Nephrology**

Interpersonal Skills and Communication Methods:
Resident Competency Evaluation Form,

Effectively establishes rapport with patients and families.
Communicates well with primary referring team and other consultants.

Presents on rounds in an organized and articulate fashion.
Functions as an effective consult team member.

Provides timely and thorough electronic documentation of patient care.

Effectively carries out difficult discussions, such as sensitive topic discussions with moderate faculty input.

Provides teaching and feedback to more junior team members on their communication styles.

Functions as an effective team leader.

Able to deal with the most challenging patients and families with minimal direction.

Coordinates team communication to optimize patient care.

Functions as an effective team leader with decreasing reliance on attending.

Functions as a consultant.

**Professionalism Methods: Resident Competency Evaluation Form, Conference Attendance**

Strives for patient care and knowledge excellence.

Reliably accomplishes assigned tasks

Demonstrates integrity, respect for others, honesty and compassion.

Demonstrates timely completion of administrative tasks and documentation.

Strives for patient care and knowledge excellence.

Reliably identifies and accomplishes necessary tasks.

Sets a tone of respect and collegiality for the team.

Acts as role model for patient care and professional behavior.
### Practice Based Learning and Improvement Methods:
#### Resident Competency Evaluation Form

<table>
<thead>
<tr>
<th>Competency</th>
<th>Details</th>
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<tbody>
<tr>
<td>Seeks and accepts feedback from team about patient care, organization and presentations.</td>
<td>Learns basic EBM principles, and article review.</td>
</tr>
<tr>
<td>Understands limits of own knowledge, and seeks help.</td>
<td></td>
</tr>
<tr>
<td>Understands EBM principles, and begins to utilize relevant research to support decision-making and teaching of junior team members.</td>
<td></td>
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<tr>
<td>Identifies knowledge deficiencies and seeks to correct them.</td>
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<tr>
<td>Appropriately integrates EBM with expert opinions and professional judgment.</td>
<td>Ability to accurately self-assess skills and performance.</td>
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