RENAL MEDICINE SENIOR RESIDENCY

TRAINING REQUIREMENTS

(A) INTRODUCTION

Renal Medicine is the branch of medicine dealing with the diagnosis and treatment of kidney diseases, including electrolyte disturbances and hypertension, and the care of those requiring renal replacement therapy, including dialysis and renal transplant patients.

The Renal Medicine Senior Residency Program is a 3-year program designed to provide individuals with the opportunity to achieve the requisite knowledge, procedural skills, practical experience and professional behaviour necessary for the practice of Renal Medicine.

(B) PROGRAMME OVERVIEW

The Renal Medicine Senior Residency Program consist of:

- 2 years ACGME-I training (R4-R5)
- 1 year JCST accredited training (R6)

The Program is structured around goals and objectives derived from three major sources: 1) the ACGME-I Foundational Program Requirements for Graduate Medical Education; 2) the ACGME-I Advanced Specialty Program requirements for Graduate Medical Education in Renal Medicine; and 3) additional input from Renal RAC, MOH Singapore.

Core experiences of the Program:

Clinical Exposure:

- The senior resident should conduct daily morning and evening exit ward rounds, managing inpatients under the supervision of a consultant.
- The senior resident should run a minimum of two outpatient clinics per week in renal medicine under the supervision of a consultant.
- They should be actively involved in communication and ethical issues with respect to patient care during their clinical exposure.
- They should be doing at least 2 night calls per month.
- They should be providing consult services (inpatient and outpatient) for other medical and surgical departments

Procedural skills:

The senior resident is expected to do a minimum of 20 kidney biopsies (of which 5 must be in transplant patients) and 20 vascular access throughout the 3 years of senior residency training.

Teaching and Education:

- The senior resident should be actively involved in supervising junior residents during ward rounds, procedures and departmental CME activities.
- The senior resident should be actively involved in departmental CME activities like morbidity and mortality rounds, journal clubs, topic updates etc
- The senior resident should also be involved in undergraduate teaching.

Personal and Professional Development:

All senior residents will be encouraged to attend courses, conferences and personal development program to improve their knowledge and leadership skills.

All senior residents should attend the Medical ethics, Professionalism and Health Law course conducted by the Singapore Medical Association.

Research and Quality:

All senior residents are encouraged to gain exposure to research and quality improvement projects under the guidance of senior clinicians. They are encouraged to present their work at local or international conferences.

Admission Requirements:

- Residents from ACGME-I programmes who have successfully completed their Basic Internal Medicine residency programme and upon passing either MRCP/PGME(S)
- Trainees who have completed Basic Specialist Training programmes in Internal Medicine and have passed MRCP

(C) TRAINING REQUIREMENTS R4-R5

Our objective is to prepare physicians who have completed three years of junior residency training in Internal Medicine to become competent Renal Physicians. The training will provide the senior resident with exposure to a wide variety of renal diseases and electrolyte abnormalities and a chance to perform the procedures necessary for the diagnosis and treatment of end-stage renal disease. The program will allow the trainees to assume increasing responsibility in the management of renal disease in ambulatory, in-patient and intensive care settings. Senior residents are expected to learn patient care, supervisory, and teaching skills. They will expand their medical knowledge base, as they apply evidence–based and cost-conscious strategies in patient care. Under the supervision of renal consultants, senior residents will develop progressive independence in their various responsibilities. As they progress in their training, senior residents will recognize the important part they play as role models, counselors, and teachers to the more junior members of the teams.

Progressive objectives

The objectives of the Renal Medicine Senior Residency program are designed to reflect a progressive increase in learning. The learning principles are based on Bloom's taxonomy, describing progression through the six learning domains: knowledge, comprehension, application, analysis, synthesis and evaluation. The levels of proficiency to be achieved at the end of the first and second year of senior residency for the various ACGME-I core competencies are as listed below.

The following are core competencies in Renal Medicine:

Patient Care:

- Principal Educational Goals:

  - Develop & refine interviewing skills
  - Develop & refine physical examination skills
  - Generate and prioritize differential diagnosis
  - Develop rational, evidence-based management strategies

- By the end of 1st Year of Senior Residency, one must be able to:

  - Elicit the patient's history, past history, and the context in which the illness or symptoms occur
  - Develop verbal and nonverbal communication skills in order to facilitate communication, elicit the emotional content of the interview, and provide comfort
  - Ensure patient's understanding of nephrology and other terms used
  - Perform an appropriate, technically correct physical examination
  - Synthesize pertinent renal data into a differential diagnosis
  - Recognize psychosocial issues that may affect patient compliance and outcomes
  - Accept personal responsibility to follow-up on patient care plans and test results
  - Formulate a diagnostic and therapeutic plan without supervision
  - Apply appropriate preventative care for the patient with kidney disease seen in an outpatient setting
  - Overcome barriers to communication, including those derived from cultural differences or physical and mental impairment
  - Generate an appropriate differential diagnosis in all patients
  - Develop an evidence-based therapeutic and diagnostic management plan independently for most patients
  - Coordinate patient care among all members of the health care team
  - Establish and identify oneself as a responsible and responsive team leader
  - Counsel and educate patients and families about kidney disease
  - Develop skills for end of life and palliative care discussions and planning for the ill patient with CKD and ESRD
  - Optimize discharge planning and follow-up in the nephrology clinic or dialysis unit
  - Perform procedures (urine microscopy, temporary catheters, renal biopsy) required by the Renal RAC.

- In addition, by the end of the 2nd Year of Senior Residency, one should be able to:

  - Use the interview to identify cognitive impairment, anxiety, denial and defensiveness and be able to manage each during the interview
  - Independently perform the procedures (urine microscopy, temporary catheters, renal biopsy) required by the Renal RAC.
  - Efficiently evaluate and manage patients in the inpatient and outpatient setting under the supervision of a Year 3 Renal senior resident.
  - Coordinate patient care among all members of the healthcare team and demonstrate leadership skills to promote multidisciplinary management
  - Demonstrate effective ability to lead end of life and palliative care discussions and planning for the ill patient with CKD and ESRD.

Medical Knowledge:

- Principal Educational Goals:

  - Expand clinically applicable knowledge base of basic and clinical nephrology sciences
  - Develop and apply an analytical approach to renal diseases and nephrology

- Learn to access and evaluate nephrology literature relevant to patient care

o By the end of 1st Year of Senior Residency, one must be able to:

- Demonstrate knowledge of commonly encountered nephrology problems
- Perform a thorough literature search for pertinent renal issues
- Describe basic pathophysiology for common nephrology and hypertension-related conditions
- Follow-up on questions regarding optimal, evidence based patient care
- Develop skills for effective case presentation and discussion of optimizing medical care for all types of renal diseases

o In addition, by the end of the 2nd Year of Senior Residency, one should be able to:

- Demonstrate improvement in performance on objective knowledge assessment (eg. NephSAP, Renal-ITE or other appropriate formative assessments).
- Demonstrate knowledge and understanding of commonly encountered in-patient and ambulatory nephrology problems
- Demonstrate knowledge of nephrology literature analysis
- Demonstrate informatics skills to promote evidence-based medicine and quality care application
- Solidify knowledge base by educating others (medical students, residents, co-senior residents, consultant faculty)
- Demonstrate a level of knowledge appropriate for level of training compared with one's peers
- Demonstrate in-depth pathophysiology for common and uncommon nephrology conditions
- Apply critical reading skills to current nephrology literature
- Read and review key journal publications on a regular basis

Interpersonal & Communication Skills:

o Principal Educational Goals

- Communicate effectively with patients with kidney disease and their families
- Communicate effectively with physician colleagues at all levels
- Communicate effectively with all non-physician members of the health care team to assure comprehensive and timely care of patients with all forms of kidney disease
- Maintain comprehensive, legible records
- Learn to communicate effectively through concise, logical and clinically useful discharge summaries

o By the end of the 1st Year of senior residency, one must be able to:

- Ensure patients' understanding of nephrology and other terms used
- Write appropriate nephrology admission and progress notes
- Communicate effectively with patients, families, nurses, and other staff
- Present nephrology cases accurately and succinctly on rounds
- Document all clinical responses to patient care needs legibly in the chart
- Develop skills to address frustration with our current healthcare system, or programmatic issues in a productive and constructive manner
- Deliver bad news to patients with kidney disease (and their families) with empathy
- Create clinically useful discharge summaries for nephrologists and other health care providers
- Work effectively as a leader of the nephrology health care team
- Demonstrate effective listening skills and reliable responsiveness to the needs of students, residents and co-fellows as well as the opinions and requests of multidisciplinary team members

- Provide education and counseling to patients, families and colleagues
- Communicate effectively with other consultants and primary care doctors to coordinate effective care and follow-up for the patient with kidney disease

o In addition, by the 2nd Year of senior residency, one should be able to:

- Deliver polished and professional formal presentations on all nephrologic issues and renal diseases
- Perform effective nephrology consultations
- Work effectively as a leader of the nephrology health care team
- Demonstrate skill in handling all difficult patient care situations
- Communicate near misses or mismanagement issues with the healthcare providers involved in an educational manner

Professionalism:

o Principal Educational Goals

- Display the elements of professionalism: altruism, accountability, excellence, duty, honor and integrity, and respect for others
- Display the principles of confidentiality, integrity and conformed consent
- Recognize the signs of diminished professionalism, including abuse of power, arrogance, greed, misrepresentation, impairment, lack of conscientiousness and conflict of interest

o By the end of the 1st Year of senior residency, one must be able to:

- Demonstrate respect, compassion, integrity, and responsiveness towards patients, families, colleagues and all members of the nephrology health care team
- Demonstrate a personal sense of altruism by consistently acting in one's patients' best interest
- Demonstrate accountability by being punctual, completing patient care tasks, attending conferences, completing administrative tasks
- Demonstrate understanding of the basic principles of patient autonomy
- Demonstrate leadership, serve as a role model for colleagues

o In addition, by the 2nd Year of senior residency, one should be able to:

- Recognize and address physician impairment
- Conduct clinical nephrology research with honesty, integrity and protection of patients' rights

Practice-Based Learning and Improvement

o Principal Educational Goals:

- Identify and acknowledge gaps in personal knowledge and skills in the care of one's patients
- Analyze nephrology practice experiences
- Develop and implement strategies for filling gaps in knowledge and skills

o By the end of the 1st Year of senior residency, one must be able to:

- Acknowledge limitations and errors and when to ask for assistance
- Perform directed study based on faculty feedback
- Seek and accept feedback from peers and faculty
- Participate in quality improvement activities and root cause analysis

- In addition, by the end of the 2nd Year of Fellowship, one should be able to:

  - Perform directed study based on results of faculty feedback
  - Analyze one's own practice by reviewing quality improvement projects
  - Teach students, residents and peers effectively about various renal issues
  - Use patient care errors to teach students, residents, and peers
  - Use information technology to enhance care of complex patients with kidney disease
  - Analyze and improve one's own practice by reviewing charts through audits

Systems-Based Practice

- Principal Educational Goals:

  - Understand and utilize the multidisciplinary resources necessary to care optimally for hospitalized patients with kidney disease
  - Learn to collaborate with other members of the health care team to assure comprehensive care of the patient with kidney disease
  - Use evidence-based, cost conscious strategies in the care of patients with all forms of kidney disease
  - Learn to analyze complex systems of care to result in improved patient outcomes

- By the end of the 1st Year of senior residency, one must be able to:

  - Collaborate with discharge planners to arrange safe and appropriate discharges for patients with kidney disease
  - Involve social workers in care of patients with kidney disease
  - Recognize the systematic complexities that affect patient outcomes
  - Function as the nephrology team leader within a multidisciplinary team
  - Serve as a patient advocate in the outpatient and inpatient setting
  - Develop a working knowledge of various care systems and the most appropriate disposition for patients with kidney disease

- By the end of the 2nd Year of senior residency, one should be able to:

  - Direct other subspecialty, surgical, nutritional, podiatric and social service consultations for patients with kidney disease
  - Use systemic approaches to reduce errors and effectively transition kidney disease patients between care settings
  - Strive to optimize patient follow-up by effective discharge planning to the nephrology clinic or dialysis unit
  - Promote medication reconciliation
  - Practice effective allocation of health care resources to avoid compromising quality of care
  - Recognize system deficiencies/complexities and strive for system improvement for patients with kidney disease

(D) TRAINING REQUIREMENTS R6

By the end of the third year, the senior resident must achieve a level of competency that demonstrates one's ability to commence independent practice in Renal Medicine. Typically this would mean supervising the Year 1 and 2 renal senior residents and junior residents on their renal rotation, providing assistance with procedures, and teaching, backed up by the renal consultant in a purely supervisory/observation mode.

Specific renal competencies –

The program's specific objectives will change as the senior resident rotate through the various postings during the 3-year training period. These progressively changing objectives should be summarized in the sections addressing these major rotations - general nephrology, glomerulonephritis, peritoneal dialysis, hemodialysis and renal transplantation. These progressive objectives are reviewed with the senior resident by the Program Director at the beginning of each rotation, i.e., each time the objectives change.

Senior residents will acquire expertise in:

(1) An understanding of normal renal biology including:

a. Renal anatomy and histology
b. Renal physiology, including in the elderly
c. Fluid, electrolyte and acid-base regulation
d. Mineral metabolism
e. Blood pressure regulation - normal and abnormal
f. Renal drug metabolism and pharmacokinetics, including drug effects on renal function and including in the elderly
g. Renal function in pregnancy
h. Basic immunologic principles, including mechanisms of disease and diagnostic laboratory testing relevant to renal diseases
i. Medical genetics

(2) Prevention, evaluation, and management of general nephrologic disorders including:

a. Acute renal failure
b. Chronic renal failure
c. End-stage renal disease
d. Fluid, electrolyte, and acid-base disorders
e. Disorders of mineral metabolism including nephrolithiasis and renal osteodystrophy (including use of lithotripsy)
f. Urinary tract infections
g. Hypertensive disorders
h. Renal disorders related to pregnancy
i. Primary and secondary glomerulopathies including infection-related glomerulopathies. This also entails a basic understanding of immunologic mechanisms of renal disease and the laboratory tests necessary for their diagnosis.
j. Diabetic nephropathy
k. Tubulointerstitial nephritis including papillary necrosis
l. Genetic and developmental renal diseases including renal cystic diseases, hereditary glomerulopathies and interstitial nephritis, systemic diseases with renal involvement, congenital malformations of the urinary tract, maternally inherited mitochondrial diseases, and renal cell carcinoma.
m. Vascular diseases including atheroembolic disease
n. Disorders of drug metabolism and renal drug toxicity
o. Renal disorders associated with the elderly including altered drug metabolism
p. Renal cystic diseases without a recognized genetic basis
q. Nutritional management of general nephrologic disorders

(3) Pre- and post-renal transplant care including:

a. Pre-transplant selection, evaluation and preparation of transplant recipients and donors including interpretation of histocompatibility results
b. Immunosuppressant drug effects and toxicity
c. Immediate postoperative management of transplant recipients
d. Immunologic principles of types and mechanisms of renal allograft rejection
e. Clinical diagnosis of all forms of rejection including laboratory, histopathologic and imaging techniques
f. Prophylaxis and treatment of allograft rejection
g. Recognition and medical management of nonrejection causes of allograft dysfunction
a. including urinary tract infections, acute renal failure, and others
h. Understanding major causes of post-transplant morbidity and mortality
i. Fluid, electrolyte, mineral and acid-base regulation in post-transplant patients
j. Long-term follow-up of transplant recipients in the ambulatory setting including
b. economic and psychosocial issues
k. Principles of organ harvesting, preservation and sharing
l. Renal disease in liver, heart and bone marrow transplant recipients

(4) Dialysis and extracorporeal therapy including:

a. Evaluation and selection of patients for acute hemodialysis or continuous renal replacement therapies
b. Evaluation of end-stage renal disease patients for various forms of therapy and their instruction regarding treatment options
c. Drug dosage modification during dialysis and other extra-corporeal therapies
d. Evaluation and management of medical complications in patients during and between dialyses and other extra-corporeal therapies, and an understanding of their pathogenesis and prevention
e. Long-term follow-up of patients undergoing chronic dialysis including their dialysis prescription modification and assessment of adequacy of dialysis
f. An understanding of the special nutritional requirements of the hemodialysis and peritoneal dialysis patients
g. An understanding of the psychosocial, economic and ethical issues of dialysis
h. An understanding of end-of-life care and pain management in the care of patients undergoing chronic dialysis

I **<u>Chronic Hemodialysis</u>**

- An understanding of the principles and practice of hemodialysis including the establishment of vascular access, the principles of different forms of vascular access, and how to choose appropriate choices.
- An understanding of the technology of hemodialysis including the various dialyzers, dialysis machines and dialysis modalities
- An understanding of how to write a hemodialysis prescription, including the anticoagulation protocol and how to assess hemodialysis dialysis adequacy
- Assessment and care of the vascular access and complications of the vascular access
- An understanding of the complications of hemodialysis including hypotension, hypertension, problems with anticoagulation, fluid management, and other less common complications and their management
- An understanding of dialysis water treatment, delivery systems and dialyzer reuse
- An understanding of infection control within the dialysis unit

II **<u>Peritoneal Dialysis</u>**

- 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.
- An understanding of the technology of peritoneal dialysis including the use of cyclers
- Assessment of peritoneal dialysis efficiency using peritoneal equilibration testing and the principles of peritoneal biopsy
- An understanding of how to write a peritoneal dialysis prescription and how to assess peritoneal dialysis adequacy
- The pharmacology of commonly used medications and their kinetic and dosage alteration with peritoneal dialysis
- An understanding of the complications of peritoneal dialysis including peritonitis and its treatment, exit site and tunnel infections and their management, hernias, plural effusions and other less common complications and their management
- An understanding of dialysis water treatment, delivery systems and dialyzer reuse

(5) Personally conducting the following procedures independently and competently

a. Urinalysis
b. Percutaneous biopsy of native and transplanted kidneys
c. Peritoneal dialysis
d. Placement of temporary vascular access for hemodialysis and related procedures including use of vascular ultrasound guidance
e. Acute and chronic hemodialysis
f. Continuous renal replacement therapies

(6) Understanding indications, complications (if relevant), and interpretation of the following procedures Independently and competently:

a. Placement of peritoneal catheters
b. Renal imaging - ultrasound, CT, IVP, MRI, angiography, and nuclear medicine studies
c. Therapeutic plasmapheresis
d. Radiology, angioplasty and declotting of vascular access

(7) Special areas in the management of patients of renal diseases including:

a. Psychosocial and economic issues confronting patients with renal disease
b. Ethical issues relevant to care of patients with renal disease
c. Optimizing the relationship of the nephrologist with other health care providers
d. Optimizing mechanisms towards achieving life-long learning as a nephrologist
e. Quality assessment and improvement, patient safety, risk management, preventative medicine, and physician impairment as it relates to the nephrologist

(E) LOG OF OPERATIVE / CLINICAL EXPERIENCE

All residents must keep a log of their operative / clinical experience in the Electronic logging system.

(F) ASSESSMENT AND EXAMINATIONS

I. Supervisors Assessment

All residents will be supervised by a designated supervisor. The ratio for all teaching (physician) faculty to residents should be 1:1, and the number of core clinical faculty to resident ratio must be no less than 1:2.

The supervisor's evaluation of the resident should be performed at the end of every rotation using the designated form and then submitted to the RAC for review

II. Work Hours

Work hours can be defined as all clinical and academic activities related to residency training. The following are residents' Duty Hours in the Learning and Working Environment:

- Work hours must be limited to 80 hours per week, averaged over a month, including all on-calls.
- Residents must be allowed 1 day (i.e. 24 continuous hours) in 7 days free from all clinical administrative and academic responsibilities, averaged over four weeks period.
- Continuous onsite duty, including in-house call must not exceed 24 hours. Resident may remain on duty for up to 6 hours for didactic activities, transfer of care, conduct outpatient clinics and maintain continuity clinics. No new patients to be seen by the resident after 24 hours onsite duty.
- There must be a 10-hour rest period provided between all daily duty periods and after in-house call.
- Resident must be given at least 16 hours of protected educational time averaged over four weeks period.

Work hours must be reported in the Residency Management System and which will be monitored by the Programme Executive. Violations of Duty Hours will be reported to the Program Director.

III. Assessment

The following are details of evaluations/assessment to be administered for each resident:

1. Formative Evaluation

a) The faculty must evaluate resident performance in a timely manner during each rotation or similar educational assignment and document this evaluation at completion of the assignment.

b) The program must:

i. provide objective assessments of competence in patient care, medical knowledge, practice-based learning and improvement, interpersonal and communication skills, professionalism, and systems-based practice;

ii. use multiple evaluators (e.g., faculty, peers, patients, self, and other professional staff);

iii. document progressive resident performance improvement appropriate to educational level; and,

iv. provide each resident with a documented semi-annual evaluation of performance with feedback.

c) The evaluations of resident performance must be accessible for review by the resident, in accordance with institutional policy.

d) Assessment must include a review of case volume, and breadth and complexity of patient cases.

e) Assessment should specifically monitor resident knowledge by use of formal in-service cognitive exams (e.g. NephSAP; Renal-ITE; or other appropriate formative assessments).

2. Summative Evaluation

a) The program director must provide a summative evaluation for each resident upon completion of the program. This evaluation must become part of the resident's permanent record maintained by the institution, and must be accessible for review by the resident in accordance with institutional policy.

b) The evaluation must:

i. document the resident's performance during the final period of education, and
ii. verify the resident has demonstrated sufficient competence to enter practice without direct supervision.

IV. Feedback

Residents should perform a yearly evaluation of teaching faculty and the training programme using the designated forms. These forms must be submitted to the RAC and kept absolutely confidential.

(G) CHANGES IN TRAINEESHIP PERIOD AND LEAVE OF ABSENCE

I. Changes in Training Period

Residency should be continuous. If a training programme is interrupted for any reason whatsoever, the RAC may at its discretion, require the residents to undergo a further period of training in addition to the minimum requirements of the programme or terminate the residency altogether. All residents are required to conform to the residency training plan as approved by the RAC and complete all the exit and training requirements within the maximum candidature.

II. Leave Of Absence

All residents are to comply with the prevailing MOH policy on Leave of Absence.

III. Overseas Postings

Overseas attachment during Senior Residency training is not permitted with the exception of Radiation Oncology and Neurosurgery (*refer to JCST Circular 114/14*).