Specialty Training Requirements (STR)

Name of Specialty:	Renal Medicine
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Note : In addition to the training requirements stated in this STR, residents must comply with any other regulatory requirements or practice-based requirements mandated by the healthcare institutions or place of practice.

Scope of Renal Medicine

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.

Purpose of the Residency Programme

The Renal Medicine Residency Programme is designed to provide residents with the opportunity to achieve the requisite knowledge, procedural skills, practical experience and professional behaviour necessary for the practice of Renal Medicine.

Admission Requirements

At the point of application for this residency programme:

a) Applicants must be employed by employers endorsed by Ministry of Health (MOH), and

b) Residents who wish to switch to this residency programme must have waited at least one year between resignation from his / her previous residency programme and application for this residency programme.

At the point of entry to this residency programme, residents must have fulfilled the following requirements:

c) Have completed local Internal Medicine Residency programme and attained the MRCP (UK) and / or Master of Medicine (Internal Medicine) (NUS) qualifications or equivalent. Potential residents without these qualifications will need to seek ratification from the JCST before they can be considered for the programme, and

d) Have a valid Conditional or Full Registration with Singapore Medical Council (SMC).

Selection Procedures

Applicants must apply for the programme through the annual residency intake matching exercise conducted by MOH Holdings (MOHH).

Continuity plan: Selection should be conducted via a virtual platform in the event of a protracted outbreak whereby face-to-face on-site meeting is disallowed and cross institution movement is restricted.

Less Than Full Time Training

Less than full time training is not allowed. Exceptions may be granted by Specialist Accreditation Board (SAB) on a case-by-case basis.

Non-traditional Training Route

The programme should only consider the application for mid-stream entry to residency training by an International Medical Graduates (IMG) if he / she meets the following criteria:

a) He / she is an existing resident or specialist trainee in the United States, Australia, New Zealand, Canada, United Kingdom and Hong Kong, or in other centres / countries where training may be recognised by the SAB; and
b) His / her years of training are assessed to be equivalent to the local training by JCST and / or SAB.

Applicants may enter residency training at the appropriate year of training as determined by the Programme Director (PD) and RAC. The latest point of entry into residency for these applicants is Year 1 of the senior residency phase.

Note: Entering at Year 1 of the senior residency phase by IMG in any of the IM-related programmes / subspecialty programmes is regarded as 'mid-stream entry' because it requires the recognition of the overseas Junior Residency training / specialist accreditation of the base specialties respectively.

Separation

The PD must verify residency training for all residents within 30 days from the point of notification for residents' separation / exit, including residents who did not complete the programme.

Duration of Specialty Training

The training duration must be 36 months of Internal Medicine Junior Residency and 42 months of Renal Medicine Senior Residency.

Maximum candidature: All residents must complete the training requirements, requisite examinations and obtain their exit certification from JCST not more than 36 months beyond the usual length of their training programme. The total candidature for Renal Medicine is 36 months Internal Medicine residency + 42 months Renal Medicine residency + 36 months candidature.

Nomenclature: Renal Medicine residents will be denoted by SR1, SR2 and SR3 according to their residency year of training.

"Make-up" Training

"Make-up" training must be arranged when residents

- Exceed days of allowable leave of absence / duration away from training; or
- Fail to make satisfactory progress in training.

The duration of make-up training should be decided by the Clinical Competency Committee (CCC) and should depend on the duration away from training and / or the time deemed necessary for remediation in areas of deficiency. The CCC should review residents' progress at the end of the "make-up" training period and decide if further training is needed.
Any shortfall in core training requirements must be made up by the stipulated training year and / or before completion of residency training.

Learning Outcomes: Entrustable Professional Activities (EPAs)

Residents must achieve level 4 of the following EPAs by the end of residency training:

	Title
EPA 1	Providing care for patients with Acute Kidney Injury (AKI) and with complex fluid / electrolyte and acid / base disorders
EPA 2	Providing care for patients with Chronic Kidney Disease (CKD)
EPA 3	Providing care for patients with End Stage Renal Disease (ESRD)
EPA 4	Providing care for kidney transplant recipients (and donor)
EPA 5	Performing Renal-Related Procedures

Learning Outcomes: Core Competencies, Sub-competencies and Milestones

The programme must integrate the following competencies into the curriculum, and structure the curriculum to support resident attainment of these competencies in the local context.

Residents must demonstrate the following core competencies:

1) Patient care and Procedural Skills

Residents must demonstrate the ability to:

- Gather essential and accurate information about the patient
- Counsel patients and family members
- Make informed diagnostic and therapeutic decisions
- Prescribe and perform essential medical procedures
- Provide effective, compassionate and appropriate health management, maintenance, and prevention guidance

Residents must demonstrate competence in:

- Interviewing skills
- Physical examination skills
- Generating and prioritising differential diagnosis
- Developing rational, evidence-based management strategies of patients with renal diseases

2) Medical knowledge

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

- Have knowledge 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

Residents will acquire expertise in:

- **An understanding of normal renal biology including:**
  - Renal anatomy and histology
  - Renal physiology, including in the elderly
  - Fluid, electrolyte and acid-base regulation
  - Mineral metabolism
  - Blood pressure regulation - normal and abnormal
  - Renal drug metabolism and pharmacokinetics, including drug effects on renal function and including in the elderly
  - Renal function in pregnancy
  - Basic immunologic principles, including mechanisms of disease and diagnostic laboratory testing relevant to renal diseases
  - Medical genetics
- **Prevention, evaluation, and management of general nephrologic disorders including:**
  - Acute renal failure
  - Chronic renal failure
  - End-stage renal disease
  - Fluid, electrolyte, and acid-base disorders
  - Disorders of mineral metabolism including nephrolithiasis and renal osteodystrophy (including use of lithotripsy)
  - Urinary tract infections
  - Hypertensive disorders
  - Renal disorders related to pregnancy
  - 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
  - Diabetic nephropathy
  - Tubulointerstitial nephritis including papillary necrosis

- 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
- Vascular diseases including atheroembolic disease
- Disorders of drug metabolism and renal drug toxicity e.g. oncology
- Renal disorders associated with the elderly including altered drug metabolism
- Renal cystic diseases without a recognised genetic basis
- Nutritional management of general nephrologic disorders

- **Pre- and post-renal transplant care including:**
  - Pre-transplant selection, evaluation and preparation of transplant recipients and donors including interpretation of histocompatibility results
  - Immunosuppressant drug effects and toxicity
  - Immediate postoperative management of transplant recipients
  - Immunologic principles of types and mechanisms of renal allograft rejection
  - Clinical diagnosis of all forms of rejection including laboratory, histopathologic and imaging techniques
  - Prophylaxis and treatment of allograft rejection
  - Recognition and medical management of nonrejection causes of allograft dysfunction including urinary tract infections, acute renal failure, and others
  - Understanding major causes of post-transplant morbidity and mortality
  - Fluid, electrolyte, mineral and acid-base regulation in post-transplant patients
  - Long-term follow-up of transplant recipients in the ambulatory setting including economic and psychosocial issues
  - Principles of organ harvesting, preservation and sharing
  - Renal disease in liver, heart and bone marrow transplant recipients
- **Dialysis and extracorporeal therapy including:**
  - Evaluation and selection of patients for acute haemodialysis or continuous renal replacement therapies
  - Evaluation of end-stage renal disease patients for various forms of therapy and their instruction regarding treatment options
  - Drug dosage modification during dialysis and other extracorporeal therapies
  - Evaluation and management of medical complications in patients during and between dialyses and other extracorporeal therapies, and an understanding of their pathogenesis and prevention
  - Long-term follow-up of patients undergoing chronic dialysis including their dialysis prescription modification and assessment of adequacy of dialysis
  - An understanding of the special nutritional requirements of the haemodialysis and peritoneal dialysis patients
  - An understanding of the psychosocial, economic and ethical issues of dialysis
  - An understanding of end-of-life care and pain management in the care of patients undergoing chronic dialysis
  - Chronic Haemodialysis

        - An understanding of the principles and practice of haemodialysis 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 haemodialysis including the various dialyzers, dialysis machines and dialysis modalities
        - An understanding of how to write a haemodialysis prescription, including the anticoagulation protocol and how to assess haemodialysis dialysis adequacy
        - Assessment and care of the vascular access and complications of the vascular access
        - An understanding of the complications of haemodialysis 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
    - **Peritoneal Dialysis**
        - 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 and remote monitoring of therapy
        - 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
- **Understanding and conducting the following procedures competently**
    - Urinalysis
    - Percutaneous biopsy of native and transplanted kidneys
    - Peritoneal dialysis
    - Placement of temporary vascular access for haemodialysis and related procedures including use of vascular ultrasound guidance
    - Acute and chronic haemodialysis
    - Continuous renal replacement therapies
- **Understanding indications, complications (if relevant), and interpretation of the following procedures:**
    - Placement of peritoneal and haemodialysis catheters
    - Renal imaging - ultrasound, CT, IVP, MRI, angiography, and nuclear medicine studies
    - Therapeutic plasmapheresis

    - Radiology, angioplasty and declotting of vascular access
- **Special areas in the management of patients of renal diseases including:**
    - Psychosocial and economic issues confronting patients with renal disease
    - Ethical issues relevant to care of patients with renal disease
    - Optimising the relationship of the nephrologist with other health care providers
    - Optimising mechanisms towards achieving life-long learning as a nephrologist
    - Quality assessment and improvement, patient safety, risk management, preventative medicine, and physician impairment as it relates to the nephrologist

3) System-based practice

Residents must demonstrate the ability to:

- Work effectively in various health care delivery settings and systems relevant to nephrology
- Coordinate patient care within the health care system relevant to nephrology
- Incorporate considerations of cost awareness and risk / benefit analysis in patient care
- Advocate for quality patient care and optimal patient care systems
- Work in inter-professional teams to enhance patient safety and improve patient care quality. This includes effective transitions of patient care and structured patient hand-off processes.
- Participate in identifying systems errors and in implementing potential systems solutions

Residents must demonstrate ability to:

- Understand and utilise the multidisciplinary resources necessary to care optimally for hospitalised patients with kidney disease
- 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

4) Practice-based learning and improvement

Residents must demonstrate a commitment to lifelong learning.

Resident must demonstrate the ability to:

- Investigate and evaluate patient care practices
- Appraise and assimilate scientific evidence
- Improve the practice of medicine
- Identify and perform appropriate learning activities based on learning needs
- Identify and acknowledge gaps in personal knowledge and skills in the care of one's patients

- Analyse nephrology practice experiences
- Develop and implement strategies for filling gaps in knowledge and skills
- Learn to analyse complex systems of care to result in improved patient outcomes

5) Professionalism

Residents must demonstrate:

- A commitment to professionalism and adherence to ethical principles including the SMC's Ethical Code and Ethical Guidelines (ECEG).
- The elements of professionalism: altruism, accountability, excellence, duty, honour and integrity, and respect for others
- The principles of confidentiality, integrity and conformed consent
- Ability to recognise the signs of diminished professionalism, including abuse of power, arrogance, greed, misrepresentation, impairment, lack of conscientiousness and conflict of interest

Residents must:

- Demonstrate professional conduct and accountability
- Demonstrate humanism and cultural proficiency
- Maintain emotional, physical and mental health, and pursue continual personal and professional growth
- Demonstrate an understanding of medical ethics and law

6) Interpersonal and communication skills

Residents must demonstrate ability to:

- Effectively exchange information with patients, their families and professional associates.
- Create and sustain a therapeutic relationship with patients and families
- Work effectively as a member or leader of a health care team
- Maintain accurate medical records
- 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
- communicate effectively through concise, logical and clinically useful discharge summaries

Other Competency: Teaching and Supervisory Skills

Residents must demonstrate ability to:

- Teach others
- Supervise others

Learning Outcomes: Others

Residents must attend Medical Ethics, Professionalism and Health Law course conducted by Singapore Medical Association (SMA).

Curriculum

The curriculum and detailed syllabus relevant for local practice must be made available in the Residency Programme Handbook and given to the residents at the start of residency.

The PD must provide clear goals and objectives for each component of clinical experience.

Learning Methods and Approaches: Scheduled Didactic and Classroom Sessions

Didactic and classroom sessions are done in every rotation. These include a variety of subspecialty teachings, journal clubs, case-based lectures and didactic lectures.

Residents must attend at least 70% of the stipulated didactic sessions.

In the event of a protracted outbreak, program should move all teaching to virtual platforms.

Learning Methods and Approaches: Clinical Experiences

Residents must do the following rotations:

- 6 months Haemodialysis
- 6 months General Nephrology
- 6 months Peritoneal Dialysis
- 6 months Transplant
- 6 months Glomerulonephritis
- 6 months Acute & Interventional Nephrology
- 6 months Geriatric Medicine / General Medicine

Residents must do at least 3 months of their Renal Medicine rotation during R5-R7 at a different sponsoring institution.

Residents should:

- Conduct morning and evening exit ward rounds, managing inpatients under the supervision of a consultant
- Run a minimum of two outpatient clinics per week in renal medicine under the supervision of a consultant
- Be actively involved in communication and ethical issues with respect to patient care during their clinical exposure
- Do at least 2-night calls per month
- Provide consult services (inpatient and outpatient) for other medical and surgical departments

In the event of a protracted outbreak, whereby face-to-face on-site meeting is disallowed and cross-institution movement is restricted, residents will resume their posting in their own sponsoring institution.

Learning Methods and Approaches: Scholarly/Teaching Activities

Residents are strongly encouraged to perform the following scholarly / teaching activities:

	Name of activity	Brief description: nature of activity, minimum number to be achieved, when it is attempted
1.	Teaching presentations	• Journal club, uncommon cases and topical updates on nephrology subspecialties
2.	Teaching and supervision of junior staff and medical students	• Daily teaching and supervision of junior staff (junior residents, house officers and medical officers) during ward rounds; supervision of procedures. • Teaching of medical students for the specific period in which they have been assigned to do so.
3.	Poster or oral presentation at local or overseas conferences	• At least once during residency
4.	Publication	• Publication of research projects

In the event of a protracted outbreak, the continuity plan will move all teaching presentations to virtual platforms. Teaching and supervision of junior staff and medical students will be done under the prevailing outbreak clinical and educational guidelines.

Learning Methods and Approaches: Documentation of Learning

Residents must keep a log of their operative / clinical experiences in their mandatory postings (Haemodialysis, General Nephrology, Peritoneal Disease, Acute & Interventional Nephrology, Glomerulonephritis and Transplant) in the electronic logging system to demonstrate sufficient experience.

Procedural skills:

- The Senior Resident is expected to do a minimum of 20 kidney biopsies (of which 5 must be in transplant patients) and successfully inserted 20 haemodialysis catheters throughout the 42 months of senior residency training.

Summative Assessments

	Summative assessments	
	Clinical, patient-facing, psychomotor skills etc.	Cognitive, written etc.
SR3-SR4	Clinical: OSCE / Viva 6 stations: 15 minutes per station	European Specialty Examination in Nephrology (ESENeph) Written: Paper 1 and 2 (100 MCQs, 3 hours each) can be taken from SR3 onwards
SR2	Nil	Nil
SR1	Nil	Nil

S/N	**Learning outcomes**	**Summative assessment components**						
		European Specialty Examination in Nephrology (ESENeph)	OSCE / Viva					
			Clinical Nephrology	Acute Nephrology	Glomerular Disease	Haemodialysis	Peritoneal Dialysis	Transplant
1	EPA 1: Providing care for patients with Acute Kidney Injury (AKI) and with complex fluid / electrolyte and acid / base disorders	✓	✓	✓	✓	✓	✓	✓
2	EPA 2: Providing care for patients with Chronic Kidney Disease (CKD)	✓	✓	✓	✓			✓
3	EPA 3: Providing care for patients with End Stage Renal Disease (ESRD)	✓		✓		✓	✓	✓
4	EPA 4: Providing care for kidney transplant recipients (and donor)	✓		✓				✓

5	EPA 5: Performing Renal-Related Procedures	✓		✓	✓	✓		✓