



الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

Transplant Nephrology



بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

PREFACE

- This document aims to enrich the training experience of postgraduate trainees by outlining their learning objectives for becoming independent and competent future practitioners.
- The curriculum may contain sections outlining some training regulations; however, such regulations need to be sought from the "General Bylaws of Training in Postgraduate Programs" and "Executive Policies" published by the Saudi Commission for Health Specialties (SCFHS). In case of discrepancies in regulation statements, the one stated in the most updated bylaws and executive policies will be the reference to apply.
- Because the curriculum is subject to periodic refinement, please refer to the electronic version posted online at www.scfhs.org.sa for the most updated edition.

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Any amendment to this document shall be approved by the Specialty Scientific Council and the Executive Council of the Commission and shall be considered effective from the date of updating the electronic version of this curriculum, published on the commission website unless different implementation dates have been mentioned.

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III. TABLE OF CONTENTS

PREFACE	3
I. CONTRIBUTORS:	4
II. COPYRIGHT STATEMENTS:	5
iii. TABLE OF CONTENTS	6
A. INTRODUCTION	8
1. Context of Practice:	8
2. Goals and Responsibilities of Curriculum Implementation:	8
B. ABBREVIATIONS	11
C. PROGRAM ENTRY REQUIREMENTS	12
D. LEARNING AND COMPETENCIES	13
1. Introduction to Learning Outcomes and Competency-Based Education	13
2. Program Duration	23
3. Program Rotations	24
4. Mapping of Learning Objectives and Competency Roles in Program Rotations	29
E. TEACHING METHODS	33
a) Program-Specific Learning Activities	33
b) Core Specialty Topics	34
F. ASSESSMENT AND EVALUATION	35
1. Purpose of Assessment	35
2. Formative Assessment of The Kidney Transplant Nephrology Program	35
3. Summative Assessment of the Kidney Transplant Nephrology Program	37
G. PROGRAM AND COURSE EVALUATION	41
H. POLICIES AND PROCEDURES	41
I. APPENDICES	43
Appendix A: Example of an academic half day activities	43
Appendix B: Core Specialty Topics	45



Appendix C

53

J. REFERENCES

54



A. INTRODUCTION

1. Context of Practice:

Substantial advancements in renal transplantation and transplant immunology have given rise to transplant nephrology as a recognized subspecialty. Currently, renal transplantation is viewed not just as an extension of nephrology but as a highly specialized discipline that demands dedicated training and expertise.

Kidney transplantation is widely accepted as the optimal treatment for patients with stage V chronic kidney disease (CKD), a condition that has become widespread in numerous countries, including the Kingdom of Saudi Arabia^{1,2}. Despite this, the availability of renal transplant procedures and programs in Saudi Arabia remains insufficient against the increasing number of patients with end-stage kidney disease (ESKD).

Unpublished data from the Saudi Centre for Organ Transplant (SCOT) indicated that nearly 1,164 kidney transplantations and 10 pancreatic transplantations were performed in 2022. The majority of kidney transplantations involved living related donors, with deceased donors accounting for only 10–15% of cases. Currently, approximately 20,000 individuals in Saudi Arabia are undergoing maintenance dialysis, and this number is expected to increase in the coming decades. The increasing prevalence of CKD and ESKD driven by a national epidemic of obesity, diabetes, and poorly managed hypertension³ suggests that the demand for dialysis and kidney transplantation will continue to increase.

To ensure that renal transplant recipients receive care satisfying international standards, establishing standardized training in transplant nephrology and implementing uniform documentation of educational qualifications are crucial for those aiming to lead renal transplant programs.

2. Goals and Responsibilities of Curriculum Implementation:

This curriculum aims to cultivate proficiency in adult kidney transplant nephrology, which requires collaborative efforts among trainees, educators, and institutional stakeholders. As adult learners, trainees must actively engage in self-directed learning, problem-solving, and reflective practice by integrating feedback and



formative assessments. Program directors and training committees particularly the program director and chief fellow, play important roles in implementing the curriculum, ensuring alignment with competency-based training models and fostering trainee accountability.

The Saudi Commission for Health Specialties (SCFHS) enforces a standardized competency framework to improve training quality and mandates the inclusion of research and evidence-based medicine in postgraduate curricula. Training centers and regional supervisory committees oversee program execution, whereas the Specialty Scientific Committee ensures that curriculum updates align with global educational standards. For example, structured rotations in pre-transplant evaluation, postoperative care, and immunosuppression management as outlined in the Renal Transplant Fellowship Training Program reinforce clinical expertise.

Key components of successful training include:

Structured clinical rotations (e.g., inpatient/outpatient care and histocompatibility laboratories).

Research integration, with fellows expected to contribute to scholarly projects.

Multidisciplinary collaboration with surgeons, immunologists, and transplant coordinators.

Programs such as the Transplant Nephrology Core Curriculum (TNCC) and ACGME-accredited fellowships emphasize standardized training to address the growing demand for transplant specialists, particularly in regions such as Saudi Arabia that are facing rising CKD/ESKD prevalence. By aligning with the SCFHS governance and global best practices, this curriculum prepares trainees to lead transplant programs while advancing the field through research and innovation.



B. ABBREVIATIONS

Abbreviation	Description
SCFHS	Saudi Commission for Health Specialties
HLA	Human leucocyte antigen
HLA-i	Human leucocyte antigen incompatibility
ABO-i	ABO blood group incompatibility
CKD	Chronic kidney disease
ESRD	End stage renal disease
X-Match	Cross match
DSAs	Donor specific antibodies
KPD	Kidney paired donation
SCOT	Saudi Centre for Organ Transplantation
CMV	Cytomegalovirus
EBV	Epstein-Barr virus
Mini-CEX	Mini clinical evaluation exercises
CbDs	Case based discussion
DOPS	Direct observation of procedure skills

C. PROGRAM ENTRY REQUIREMENTS

Please refer to the updated executive policy of SCFHS on admission and registration.

Website: www.scfhs.org.sa



D. LEARNING AND COMPETENCIES

1. Introduction to Learning Outcomes and Competency-Based Education

The primary goal of the renal transplant fellowship program is to deliver advanced, specialized training in renal transplantation to nephrology fellows and certified nephrologists. This training was designed to prepare them for independent practice and leadership roles in the field of transplant nephrology. Applicants to the program must be certified nephrologists or meet the eligibility criteria for nephrology certification at the time of enrollment.

(Adapted from Royal College of physicians and surgeons of Canada-Competency training requirements for the area of focused competence in solid organ transplantation. Royal college.ca)

Upon completion of training, the fellow will be able to demonstrate the following competencies:

a) Medical expert:

The fellow will integrate the knowledge, clinical abilities, and professional skills acquired during the training period to provide optimal care for kidney transplant patients. Transplant fellows are expected to:

Act Effectively as Consultants

- Conduct thorough consultations and communicate findings and management plans in written, verbal, and digital formats.
- Recognize and appropriately address ethical dilemmas in patient management.
- Demonstrate the ability to prioritize professional responsibilities when managing multiple patients and complex issues.
- Exhibit compassionate and patient-centered care.
- Identify and navigate ethical considerations in medical decision-making.
- **Assessment of Transplant Candidates:**
 - Evaluation of the underlying causes of end-stage renal disease and the potential for disease recurrence in allografts
 - Determine the suitability of life-sustaining therapies as a bridge to transplantation
 - Establish the indications and contraindications for kidney transplantation, considering factors such as:
 - ❖ Anatomical compatibility
 - ❖ Immunologic risk profile
 - ❖ Predictive factors for survival pre- and post-transplantation
 - ❖ Pre-existing comorbidities
 - ❖ Infectious disease risks and immunization status
 - To analyze how the source of donor organs (living versus deceased) affects recipient outcomes:
 - ❖ Risk of disease recurrence
 - ❖ Surgical complications related to kidney implantation
 - ❖ Timing of transplantation
 - ❖ Anatomical suitability
- **Evaluation of Potential Organ Donors:**
 - Assess both living and deceased donors.
 - Factors include age, comorbidities, anatomical considerations, risk of transmittable diseases, and methods used to assess kidney function.



- Apply principles of donor management to optimize organ procurement and function.
- Understanding immediate and long-term risks to living donors and ensuring appropriate follow-up care.
- **Organ Allocation:**
 - Understand the purpose and limitations of tissue typing laboratory tests, including:
 - ❖ Human leukocyte antigen (HLA) typing
 - ❖ Panel reactive antibody (PRA) testing
 - ❖ Donor-specific antibody (DSA) identification
 - ❖ Crossmatching
 - Consider factors in organ allocation, including:
 - ❖ Anatomical considerations
 - ❖ Predicted organ function
 - ❖ Immunologic factors (blood group, crossmatch results, HLA match, PRA status, and DSA status)
 - ❖ Risk of transmissible infection or disease
 - ❖ Prioritization among waitlisted individuals
- **Perioperative Care:**
 - Understanding the pathophysiology, histology, prevention, recognition, and management of ischemia-reperfusion injury.
 - Differentiation and management of early allograft dysfunction, considering immunological and non-immunological causes, including primary graft dysfunction.
 - Manage early complications of kidney transplantation, such as arterial and venous issues, anastomotic leaks, hemostasis, and anticoagulation.
- **Transplant Immunology and Immunosuppression:**
 - Demonstrate knowledge of transplant immunology and immunosuppression.
 - Understand tests used to assess immunologic risk.
 - Mechanisms of action, pharmacokinetics, adverse effects, and appropriate use of immunosuppressive agents, including biological agents, corticosteroids, purine analogs, calcineurin inhibitors, and mTOR inhibitors.

- Development of immunosuppressive regimens considering efficacy, patient profiles, therapeutic monitoring, and minimization of toxicity.
- Complications of immunosuppression, include infections (CMV, EBV, BKV), malignancies (PTLD), drug-induced allograft dysfunction, and delayed growth/development.
- **Transplant Kidney Function:**
 - Use appropriate methods for allograft function surveillance.
 - Investigate and differentiate causes of allograft dysfunction.
 - Understand risk factors, pathology, and the Banff classification for rejection.
 - Manage rejection and select appropriate treatments.
 - Other causes of transplanted organ dysfunction, include recurrence of the primary disease, medication toxicity, technical complications, and chronic allograft dysfunction.
- **End-Stage Allograft Dysfunction:**
 - Understanding the etiology, prevention, diagnosis, and management of end-stage allograft dysfunction.
 - Determine the role of altering immunosuppression.
 - Assess patients with end-stage allograft dysfunction for repeat transplantation or other life-sustaining therapies.
- **Patient Assessment:**
 - Obtain relevant, concise, and accurate patient histories through document review.
 - Select appropriate investigative methods in a resource-effective and ethical manner, including:
 - ❖ Investigations to assess donor suitability
 - ❖ Investigations to assess recipient suitability
 - ❖ Therapeutic drug monitoring strategies
 - Demonstrate effective clinical problem-solving and judgment, including interpreting data and generating differential diagnoses and management plans.
 - ❖ Interpret immunologic test results.



- ❖ Interpret the results of tests determining donor suitability, including organ function tests and serological/molecular testing for transmissible diseases.
- ❖ Interpret the results of tests assessing transplanted organ function (biochemistry, hemodynamics, diagnostic imaging) and pathology results of kidney biopsies.
- ❖ Interpret therapeutic drug monitoring results.
- **Preventive and Therapeutic Interventions:**
 - Apply preventive and therapeutic interventions relevant to kidney transplantation.
 - Recommend appropriate vaccinations.
 - Apply prophylactic strategies to reduce infection risk.
 - Apply strategies for surveillance of organ dysfunction.
 - Adjust immunosuppressive medications to optimize allograft function and minimize adverse effects.
- **Procedural Skills:**
 - Demonstrate proficiency in performing transplant kidney biopsies.

b) Manager:

As managers, kidney transplant physicians are integral to healthcare organizations. They organize sustainable practices, allocate resources, and enhance the effectiveness of the healthcare system. They will be able to:

- Engage in activities that enhance healthcare organization and system effectiveness.
- Describe the structure and function of the healthcare system related to solid organ transplantation, including the physician's role.
- Effectively manage their practice and career.
- Prioritize and manage time effectively in the context of end-stage organ disease and organ retrieval timelines and balance patient care, practice demands, outside commitments, and personal well-being.
- Allocate healthcare resources effectively.
- Demonstrate an understanding of the equitable allocation of healthcare resources, balancing effectiveness, efficiency, and access.

- Understand the transplant physician's central role in fair organ allocation.
- Describe organ allocation algorithms, addressing:
 - Optimal use of a scarce resource.
 - Timing of transplant for individual patients.
 - Balance between life-saving needs and safe organ acceptance.

c) Health Advocate:

As health advocates, transplant physicians leverage their expertise to enhance the well-being of their individuals, families, and communities. They are responsible for promoting organ donation, addressing systemic barriers to care, and supporting vulnerable populations. The fellows are equipped to:

Advocate for Individual Patient Needs

- Identify and respond to health-related challenges faced by patients, including:
 - Psychosocial stressors like relocation for transplant, financial burden, or lack of support.
 - Increased susceptibility to infections in both pre- and post-transplant stages.
 - Affordability and access to essential post-transplant medications.
- Encourage disease prevention and health promotion, such as:
 - Vaccination and antimicrobial strategies to prevent infections.
- Balance individual patient advocacy with broader public health considerations.

Serve the Community

- Recognize and address community health needs through:
 - Promoting both deceased and living organ donation.
 - Public education initiatives to improve donor registration and awareness.
- Understand competing interests between populations, such as:
 - Allocation decisions affecting access for specific groups (e.g., pediatric patients).

Address Population Health Determinants

- Identify health disparities affecting transplant candidates and recipients, including:
 - Geographic limitations and financial barriers to transplantation.
 - Socially marginalized groups (e.g., individuals with addiction or low income).



- Difficult to match patients based on size, immunological sensitization, or rare blood types.
- Actively support equitable access and tailor advocacy to meet the needs of vulnerable populations.

Influence Public Policy

- of legislation and policy on transplant access and outcomes, including:
 - Regulations surrounding organ donation and allocation.
 - Policies influencing post-transplant care and medication access.
- Navigate potential conflicts between their role as patient advocates and system stewards, ensuring fair and ethical allocation of life-saving resources such as organs.

d) Collaborator:

Kidney transplant physicians play an essential role in interdisciplinary healthcare teams by working collaboratively to deliver high-quality patient-centered transplant care. They are expected to:

- Engage productively and respectfully with multidisciplinary transplant teams that include transplant nephrologists, surgeons, immunology specialists, nurses, coordinators, donor advocates, and social workers.
- Clearly articulate their own professional responsibilities and scope of practice to colleagues from other disciplines.
- Demonstrates a sound understanding of the roles and expertise of other team members:
 - Transplant coordinators
 - Histocompatibility technologists and laboratory directors
 - Personnel involved in donor recognition, management, organ recovery, and distribution
 - Social workers and psychosocial evaluators
- Actively contribute to team discussions and interdisciplinary meetings.
- Participates in collaborative decision-making regarding recipient eligibility and, when relevant, living donor assessment and transplant timing.
- Foster interprofessional partnerships based on mutual respect, recognizing the collaborative nature of transplant care for both candidates and recipients.

- Navigate interpersonal challenges constructively within the healthcare team.
- Utilize collaborative dialogue to address and resolve disagreements, particularly those involving:
 - The appropriateness of transplant candidacy
 - Optimal timing for transplant procedures
 - Justification for removal from the transplant waitlist

e) Professional:

Kidney transplant physicians uphold the highest ethical standards and demonstrate integrity and accountability in their responsibilities to patients, professionals, and society. They are expected to:

- **Uphold ethical principles in clinical practice**, showing a strong commitment to patient care, medical profession, and broader community:
 - Identifying and appropriately addressing ethical dilemmas in the management of patients with end-stage organ failure, such as evaluating transplant eligibility, making waitlist decisions, and navigating issues related to transplant tourism.
 - Address ethical concerns related to organ donation, including the potential coercion of living donors, inequities in directed donation, and implications of financial incentives.
 - Recognizing and effectively managing real or perceived conflicts of interest, especially when:
 - Distributing limited transplant resources across the population
 - Balancing the sometimes competing needs of donors and recipients
- **Respect and maintain patient confidentiality**, following professional guidelines and legal requirements by:
 - Sharing donor-related information with recipients only when clinically necessary and permitted.
 - Appropriately manage the disclosure of sensitive details between living donors and recipients, such as the risks of transmissible diseases, genetic disorders, and issues of paternity.
- Adhere to professional regulations and legal standards, showing accountability through:



- Fulfilling all required legal and regulatory duties applicable to transplant practice
- Understanding the medical and legal definitions of death, including criteria for:
 - Neurological determination of death
 - Donation after circulatory death
- Applying principles of equitable organ allocation and using exceptional distribution criteria appropriately
- **Demonstrate accountability to governing bodies**, such as the SCOT and engage in practices that reflect commitment to ethical governance and continuous professional improvement.

f) Scholar:

Kidney transplant physicians are committed to the ongoing learning and the advancement of medical knowledge throughout their careers. They are expected to:

- Engage in **self-directed, reflective learning**, and development, and follow a personal plan for continuing professional development.
- Critically assess and apply the medical literature, distinguishing credible sources to inform evidence-based clinical decisions.
- **Contribute to education** by actively participating in the teaching and mentoring of patients, peers, junior trainees, medical students, and other healthcare professionals.
- Support the **creation, dissemination, and application of new knowledge** through participation in scholarly activities such as research, quality improvement, and knowledge translation initiatives.
- Promote a **culture of inquiry and innovation** within the transplant community by staying current with emerging evidence and integrating advancements into clinical practice.

g) Communicator:

Kidney transplant physicians excel at fostering effective communication, facilitating the doctor-patient relationship, and ensuring clear exchanges throughout the patient care process, including before, during, and after medical encounters. They demonstrated the following key competencies:

- **Build rapport and trust** with patients and their families, and establish strong therapeutic relationships based on respect, understanding, honesty, empathy, and trust. This is particularly crucial in the context of the uncertainty surrounding organ availability for transplantation.
- **Respect patient and donor confidentiality, privacy, and autonomy**, and ensure that all information is handled with utmost care and respect.
- **Accurately gather and synthesize information** from various sources, including patients, families, colleagues, and other healthcare professionals, to guide clinical decisions and ensure effective care.
- **Listen attentively** to patients and families to fully understand their concerns, beliefs, expectations, and experiences, as well as identify potential risk factors for transmissible diseases in both recipients and donors.
- **Communicate complex information clearly** to patients, families, and the healthcare team, ensuring that all relevant details are conveyed in an understandable manner and fostering collaboration and informed decision-making.
- **Discuss uncertainties openly**, including topics such as organ availability, timing of transplantation, organ quality, and exceptional distribution protocols, while ensuring that patients and families are fully informed.
- Collaboration with patients, families, and other healthcare professionals to **develop a shared plan of care**, considering the patient's preferences, values, and clinical situations.
- **Engage in shared decision-making** with patients and families, particularly when discussing living donations and other crucial aspects of the transplantation process.
- Effectively address difficult conversations, such as:
 - Removing a patient from the transplant waiting list
 - Communicating donor-specific risks to potential recipients
 - Informing patients that they are not suitable for organ transplantation or re-transplantation
- Ensure that all **oral, written, and electronic communications** about medical encounters are clear and concise, and maintain confidentiality regarding sensitive patient and donor information.



2. Program Duration

The duration of the fellowship program is one year.

3. Program Rotations

The training program consists of two main clinical rotations:

a) Renal Transplant Clinics (7 blocks)

- i. Pre-renal transplant assessment clinic (an outpatient activity) including potential recipients and donors
- ii. Post-renal transplant clinic (an outpatient activity)

b) Inpatient Transplant Rotation, Including Consultation (5 blocks)

- i. **In patient transplant rotation (4 blocks)** covering new and long-term transplanted patients
- ii. **In patient consultation rotation (1 block)** providing care and support for kidney transplant patients admitted to different teams.

Note: Both inpatient rotations can be a part of the same or different rotation.

Pancreatic transplantation is performed in only few kidney transplant centers; therefore, it is not mandatory in kidney transplant fellowship programs. If the transplant center has active pancreatic transplant program, the kidney transplant fellow must receive sufficient exposure to both inpatient and outpatient pancreatic transplant patient care and management.

It is not important to follow the same rotation scheme as outlined above, and each transplant center should look into their own service structure and resources. They might find their own way of arranging clinical rota that could be a mixture of both inpatient and outpatient activities on the same day or week. However, they must ensure that the transplant fellow receives training and exposure in terms of the type and duration of rotation in each area as specified above.

Trainees will have 4 weeks' vacation which is organised by their respective department.



a) Renal Transplant Clinics (7 blocks)

The kidney transplant fellow rotates in both pre-transplant assessment and post-transplant clinics. In the transplant pre-assessment clinic, patients with ESKD are referred for kidney transplant assessment and evaluation, which provide testing and consultation to help determine whether transplantation is the best treatment option. The post-transplant clinic provides ongoing care and support for a new and old kidney transplant patients.

- i. **Pre-renal transplant clinic rotation (3 blocks):** The fellow is directly involved in the evaluation of kidney and pancreatic transplant candidates and potential kidney donor candidates.

Roles and responsibilities:

- Attend ≥ 3 kidney transplant candidate and donor assessment clinic a week.
- Prepare a comprehensive medical report for transplant candidate patients and potential kidney donors.
- Attending weekly transplant candidate and donor selection committee meeting. The fellow shall participate in presenting the candidate(s) for final approval.

Specific objectives:

During this rotation, the trainee is expected to develop competency in:

- Evaluation, preparation and selection of transplant recipients and donors for both living and deceased donor kidney and pancreas transplantation.
- Demonstration of an understanding of recipient and donor evaluation and selection guidelines/protocols.
- Demonstration of an understanding of the immunological evaluation of transplant candidates, and indications for referral for PKD.

- ii. **Post-transplant clinic rotation (4 blocks)** including two weeks of training and experience in an accredited histocompatibility/tissue typing laboratory, and histopathology department:

The fellow is directly involved in the post-transplant care and management of renal and pancreatic transplant recipients. The trainee will be a primary team member delivering care to renal and pancreatic transplant recipients in the immediate post renal transplant clinic, urgent care clinic, and long-term follow-up clinic.

The fellow was expected to perform ten kidney allograft biopsies independently and competently during one year of fellowship training.

The transplant nephrology fellowship program must provide training and experience in an accredited histocompatibility/tissue-typing laboratory and histopathology department. The transplant center shall have a weekly histopathology multi-disciplinary team meeting where all biopsies and patient management are discussed.

Roles and responsibilities:

- Attend minimum 3 clinics per week including immediate post renal transplant clinic, urgent care clinic and the long-term follow up clinic
- Attend one week rotation each in histocompatibility and histopathology department.
- Perform kidney allograft biopsy.

Specific objectives:

During this rotation, the trainee is expected to develop competency in:

- Provide care and management of both immediate and long-term kidney transplant issues
- Demonstrate an understanding of the major causes of post-transplant morbidity and mortality and their management.
- Manage failing kidney allograft.
- During a week of rotation in the Histocompatibility Department, a fellow would be able to interpret the tissue typing, DSAs, and X-matches required for transplant risk assessments.
- During histopathology rotation, a fellow is expected to handle a specimen, process tissue, and perform different methods for renal parenchyma evaluation, such as light microscopy, immunofluorescence, and electron microscopy. Based on the acquired knowledge, a fellow should be able to interpret a kidney allograft biopsy based on the BANFF classification for rejection and make a diagnosis. A fellow is also expected to interpret other pathologies, such as BKV nephropathy, recurrence of glomerulonephritis and rare diseases.

b) Inpatient Transplant Rotation Including Consultation (5 blocks):

i. Inpatient Transplant Rotation (4 blocks)

The fellow is directly involved in the medical care of the renal and pancreatic transplant patients who are either admitted for kidney transplant surgery or hospitalized for any medical or transplant related issues. All hospitalized renal and

pancreatic transplant patients were jointly cared by renal transplant surgery and transplant nephrology staff.

Roles and responsibilities:

- Attend daily combined medical and surgical transplant ward rounds.
- Follow-up patients were admitted for kidney transplantation in the perioperative period and during their hospital stay under appropriate supervision.
- Attend minimum three kidney recipient and donor surgeries.
- Follow long-term transplant patients admitted with medical and/or transplant related issues.

Specific objectives:

By the end of this rotation, the trainee is expected:

- To choose appropriate immunosuppressive medications and to follow protocols.
- To identify high-immunological risks for kidney transplantation and its approach and to manage accordingly.
- To manage immediate postoperative transplant recipients.
- To manage acute tubular necrosis, delayed graft function, vascular problems, acute rejection, and disease recurrence in kidney allografts.
- To identify indications for kidney allograft biopsy and to perform biopsy independently with proper documentation.

ii. Inpatient Consultation Service (1 block):

During this rotation, a fellow is provided under the supervision of a consultant, consultations for renal transplant recipients admitted to other medical services in the hospital.

In a hospital where other organ transplants (e.g., liver, lungs, and heart transplants) are also performed, a transplant fellow along with a kidney transplant team shall (not must) also provide acute kidney injury services and advise and manage patients who had subsequently developed CKD or ESRD.

Roles and responsibilities:

- Attend daily rounds for admitted patients.
- Evaluate and manage kidney transplant recipients referred from emergency department.

- Assess and manage acute kidney injury in organ transplant recipients other than kidney.
- Evaluate kidney transplantation in organ transplant recipients with ESRD and determine their suitability for organ transplantation.
- Evaluate patients with multi-organ failure including ESKD, and determine their suitability for multi-organ transplantation.

Specific objectives:

By the end of the rotation, the trainee is expected to proficiently perform the following tasks:

- Acute management of patients presented to the emergency department.
- Evaluation, preparation, and selection of patients with ESKD for kidney transplantation among organ transplant recipients other than the kidney.
- Evaluation, preparation and selection of patients for combined kidney and other organ transplantation among patients with multi-organ failure including the kidney.
- Assessment and management of acute kidney injury in organ transplant recipients other than the kidney.



4. Mapping of Learning Objectives and Competency Roles in Program Rotations

a. Renal transplant clinic rotation

Competency Roles (Learning domains involved: K: Knowledge, S: Skills, A: Attitude)	Activities related to <u>Renal Transplant Clinics</u>			
	Conducting full potential kidney transplant recipient and kidney donor evaluation	Managing transplant recipients at risk of developing infections, rejection, recurrence of primary diseases and cardiovascular diseases	Managing transplants with acute and chronic allograft rejection	Managing patients with failing kidney allograft
Professional Expert	Mastering history taking, physical examination. Determine suitability for kidney transplant and demonstrate ability to interpret tissue typing and cross matching (K,S)	Assessing and managing immunological and non-immunological risk factors. Evaluating clinical and laboratory findings (K, S, A)	Evaluate and manage patients with rejection. Demonstrate ability to perform transplant kidney biopsy (K, S, A)	Evaluate and manage patients with failing kidney allograft. Early referral for renal replacement therapy including kidney transplant or dialysis therapy (K, S, A)
Communicator	Effectively communicating with patients and guardians (K, S, A)	Effectively communicating with patient, guardian and team members (K, S, A)	Effectively communicating with patient, guardian and team members (K, S, A)	Effectively communicating with patient, guardian and team members (K, S, A)
Collaborator		Working effectively in a Multidisciplinary team (K, S, A)	Working effectively in a Multidisciplinary team work (K, S, A)	Working effectively in a Multidisciplinary team work (K, S, A)

	Activities related to <u>Renal Transplant Clinics</u>			
Advocate	Practicing a Holistic approach when treating patients (K, S, A)	Adhering to all relevant Patient safety precautions. (K, S, A)	Adhering to all relevant Patient safety precautions (K, S, A)	Adhering to all relevant Patient safety precautions (K, S, A)
Leader	Effectively managing Time when treating patients (S)	Effectively Leading the team and situation for patient best interest (S, A)	Effectively Leading the team and situation for patient best interest (S, A)	Effectively Leading the team and situation for patient best interest (S,A)
Scholar		Applying Evidence-based practice (K, S)	Applying Evidence-based practice (K, S)	Applying Evidence-based practice (S,A)
Professional	Demonstrating appropriate Interprofessional relations with multidisciplinary team (A)	Demonstrating appropriate Interprofessional relation with multidisciplinary team (A)	Demonstrating appropriate Interprofessional relation with multidisciplinary team (A)	Demonstrating appropriate Interprofessional relation with multidisciplinary team (A)



a. Renal transplant in-patient rotation including consultation

	Activities Related to <u>Renal Transplant in-patient rotation including consultation</u>				
Competency Roles (Learning domains involved: K: Knowledge, S: Skills, A: Attitude)	Managing kidney transplant recipient peri-operatively	Managing kidney donor peri-operatively	Managing acute allograft dysfunction	Managing recurrence of primary disease, and post-transplant atypical infections	Compliance with documentation and proper reporting standards
Professional Expert	Evaluating Clinical and laboratory findings; assessing immunological and surgical risk factors; managing transplant medications, therapeutic drug monitoring, hydration (K, S, A)	Evaluating clinical and laboratory findings, hydration, NPO, and risk assessment (K, S, A)	Assessing and managing acute allograft dysfunction. Demonstrate ability to perform transplant kidney biopsies (K, S, A)	Evaluating and managing transplant recipients with a recurrence of primary disease. Assessing and managing patients with atypical infections (K, S, A)	Maintaining Relevant documentation of daily patient care, prescriptions, discharge summaries (K, S, A)
Communicator	Effectively communicating with patient, guardian and team members (K, S, A)	Effectively communicating with patient, guardian and team members (K, S, A)	Effectively communicating with patient, guardian and team members (K, S, A)	Effectively communicating with patient, guardian and team members (K, S, A)	Demonstrating appropriate Writing, dictation and presentation skills (K, S)
Collaborator	Working effectively in a Multidisciplinary team (K, S, A)	Working effectively in a Multidisciplinary team (K, S, A)	Working effectively in a Multidisciplinary team (K, S, A)	Working effectively in a Multidisciplinary team (K, S, A)	Demonstrating effective Interprofessional Communication (A)
Advocate	Adhering to all relevant Patient	Adhering to all relevant Patient	Adhering to all relevant Patient	Adhering to all relevant Patient	Continuously ensuring Quality

	Activities Related to <u>Renal Transplant in-patient rotation including consultation</u>				
	safety precautions. (K, S, A)	safety precautions. (K, S, A)	safety precautions. (K, S, A)	safety precautions. (K, S, A)	improvement (K, S, A)
Leader	Effectively Leading the team and situation for patient best interest (S, A)	Effectively Leading the team and situation for patient best interest (S, A)	Effectively Leading the team and situation for patient best interest (S, A)	Effectively Leading the team and situation for patient best interest (S, A)	Applying Quality assurance measures as per relevant guidelines (K, S, A)
Scholar	Applying Evidence-based practice (K, S)	Applying Evidence-based practice (K, S)	Applying Evidence-based practice (K, S)	Applying Evidence-based practice (K, S)	
Professional	Demonstrating appropriate Interprofessional relations with multidisciplinary team (A)	Demonstrating appropriate Interprofessional relations with multidisciplinary team (A)	Demonstrating appropriate Interprofessional relations with multidisciplinary team (A)	Demonstrating appropriate Interprofessional relations with multidisciplinary team (A)	Demonstrating appropriate Interprofessional relations with multidisciplinary team (A)



E. TEACHING METHODS

The teaching process in postgraduate fellowship training program is primarily based on the principles of adult learning theory. The trainees are expected to be aware of the importance of learning and play active roles in the content and process of their own learning.

a) Program-Specific Learning Activities

Kidney transplant nephrology fellowship program is run by various institution in different regions of Saudi Arabia. Each institution was led by an institutional program director and a coordinator. These training sites belong to a regional/nation-wide supervisory committee whose role is to initiate, maintain and supervise teaching and training activities.

There are three types of activity:

i) Academic Half Day (AHD)

This online academic activity is run jointly by all training sites in Saudi Arabia. This protected learning time aimed to improve trainees' attendance and active engagement without interruption. The topics chosen were based on the kidney transplant nephrology fellowship curriculum outlined in this document. The entire curriculum is covered in ten months and the teaching methods include presentation of essential transplant topics outlined in this curriculum and case discussions. Few sessions were devoted to multiple choice scenarios to prepare the trainees for their final written exams. The frequency of academic half days is weekly, usually commencing a few weeks after the fellows start their training. The AHD stops during public holidays and Ramadan.

See Appendix "A" as an example of academic half day activities

ii) Practice-Based Learning

Bed side teaching, attending the OR, lab time, and biopsy collection are excellent opportunities for learning. Trainees are expected to build their capacity through self-directed learning.

Practice-based learning allows educators to supervise trainees to become competent in the required practical skills that ensure fulfilment of the knowledge, psychomotor and/or attitude learning domains. Each trainee must maintain a logbook

documenting the procedures; for example, kidney allograft biopsy observed, performed under supervision, and performed independently.

Other Learning Opportunities:

These regular activities are also held at each hospital/institution and fellows are encouraged to attend these meetings for continuous learning and education.

- **Department Journal Club Meetings:** This is a monthly session in which a fellow is expected to present papers from a peer-reviewed journal.
- **Histopathology meeting (renal pathology conference):** A weekly meeting in which all renal transplant biopsies are reviewed by transplant pathologists and physicians. This is a practical and semi-didactic training session in which fellows are trained to interpret renal transplant pathologies.
- **Patient selection committee meeting (renal transplant conference):** A weekly meeting where all renal and pancreatic transplant candidates and potential living kidney donors are presented for approval by consensus. During this interactive session, the fellow learns the skills of appropriate selection of candidates and scientific justifications for approving or excluding candidates.

Fellows are encouraged to attend other meetings held at their institutions such as lectures, grand rounds, basic research methodologies, and morbidity and mortality meetings.

iii) Morning Report:

The morning report was obtained from case-based teaching session. The goals of morning reports are to teach efficient handover strategies and case presentation skills, allow discussions on the management of intersecting cases, and enhance problem-solving and multidisciplinary team skills.

b) Core Specialty Topics

The core specialty topics are important in adult kidney transplant nephrology. They were taught using case-based discussions with prepared resources. Most topics were taught during the half-day academic activities.

See **Appendix "B"** for further data



F. ASSESSMENT AND EVALUATION

1. Purpose of Assessment

Assessment is an essential component of fellowship training because it provides trainees with specific feedback on their performance, which can lead to a clearer understanding of the progress and skills gained over time. The end of training certification ensures safe clinical practice at a specialized level. Assessments assure patients and the public that health professionals are safe and competent in practice.

The purpose of the assessment during training is to:

- Support learning
- Develop professional growth
- Monitor progression
- Judge and certify competency
- Evaluate the quality of training program

General Principles

- Judgment should be based on the holistic profiling of a trainee rather than on individual traits or instruments
- Assessment should be continuous in nature
- Assessment should be strongly linked to the curriculum and the content
- The In-Training Evaluation Report (ITER) form must be completed and discussed with the fellow each time it is done.

2. Formative Assessment of The Kidney Transplant Nephrology Program

Formative Assessment Tools

Table 2 outlines the formative assessment tools approved by the SCFHS for renal transplant nephrology fellows by 2025.

Gen./ Sub.	Level	Knowledge					Skills							Attitude
		SOE	EYPT-n't	Academic Activities	CBD	EYPT-Local	OSCE/O SPE	Research	DOPS	Logbook	Volunteering	Other	mini-CEX	Evaluation - ITTERS
Renal Transplant	F1			✓	✓				✓	✓			✓	✓

SOE: Structured oral examination **CBD:** Case-based discussion **DOPS:** Direct observation of procedural skills

Mini-CEX: Mini-clinical evaluation exercises **EYPT-Local:** Promotion exam or progress test **EYPT-n't:** International

During their one-year fellowship, each trainee needed to cover the following tools:

- Knowledge:** The trainee should attend mandatory half day activities (also called academic activities) throughout the year. In addition, they have to complete a CBD which is six times in total for the entire academic year.
- Skills:** DOPS: Trainees are required to perform 10 DOPS independently under supervision and each activity is logged into their e-portfolio. Furthermore, the fellows are expected to perform six Mini-CEX during their training period. The logbook is where all DOPS are recorded; for example, in the case of 10 DOPS, there shall be 10 activities (DOPS) uploaded to the logbook. Fellows must perform more than 20 biopsies in a 1-year training program. They were required to independently perform a minimum of 10 biopsies at the end of their training. All biopsies were first observed for a certain period, and once the technique was learned, only the fellow was able to perform the biopsy under constant supervision. These are recorded in their logbooks and assessed using DOPS.
- Attitude:** The ITER is an important part of trainee feedback evaluation and is performed quarterly.

The Evaluation of each component is based on the evaluation form in appendix D.



3. Summative Assessment of the Kidney Transplant Nephrology Program

General Principles:

Trainees, as adult learners should strive to seek, and develop their performance based on, feedback throughout their journey of competency to "mastery" levels. Formative assessment is a component of assessment that is distributed throughout the year and aim to provide trainees with effective feedback.

Trainees meet their mentors every two weeks for at least one hour to review their performance reports (e.g., ITER, mini-clinical evaluation exercises [min-CEX], direct observation of procedural skills [DOPS], CBDs etc). Input from the overall formative assessment tools is utilized by the end of their 1 year of fellowship training alongside their written examination and structured oral examination (SOE) to determine their completion of training. Formative assessment is updated and approved annually by the Scientific Committee of the SCFHS.

Formative assessment usually has the following features:

- a. Multisource: Minimum four tools.
- b. Comprehensive: covering all learning domains (knowledge, skills and attitude)
- c. Relevant: focusing on work-based observations
- d. Milestone-oriented competency: reflecting trainees' expected competencies that match their developmental levels.

Trainees should actively seek feedback during training and trainers should provide timely and formative assessments. The SCFHS provides an e-portfolio (Mumaris Plus) system that enhances the communication and analysis of data from formative assessments.

Trainers and trainees are expected to follow the recommendations of the scientific council regarding the updated forms, frequency, distribution, and deadline related to the implementation of evaluation forms.

General Principles

Summative assessments evaluated the trainees' specialty knowledge and learning at the end of their training, and the results were recorded as test scores. Such assessments are an integral part of competency and provides a means of accreditation.

Certificate of Training-Completion

In order to be eligible to sit for final specialty examinations, each trainee is required to obtain "Certification of Training-Completion". Based on the training bylaws and executive policy (please refer to www.scfhs.org) trainee are granted the "Certification of Training-Completion" once the following criteria are fulfilled:

- Successful completion of all training rotation
- Completion of training requirements as outlined by the specialty's scientific committee
- Clearance from SCFHS training ensures compliance with tuition payments and the completion of universal topics.

The "Certification of Training-Completion" will be issued and approved by the local supervisory committee or its equivalent according to the SCFHS policies.



Final Specialty Examination

The final specialty examination is the summative assessment component that grants trainees specialty certification. It has three elements:

- A. Final written examination
- B. SOE
- C. Final ITER (FITER)

A. Final written examination format

The final written examination of the fellowship specialty examinations consisted of one paper with 80-120 Single Best Answer (SBA) multiple-choice questions (MCQs). These questions focused on clinical scenarios with four SBA options.

Blueprint

Table 1 provides an example of a blueprint; however, it is subject to revision and change. Therefore, trainees are directed to check the published examination blueprint annually on the SCFHS website (www.scfhs.org).

Table 1: Blueprint Outlines (examples for 100-item exam)

No.	Sections	Percentage (%)
1	Transplantation Immunology (including ABO-I, HLA-I, PKE)	20
2	Donor workup & care	10
3	Recipient workup	10
4	Immunosuppressive therapy	10
5	Peri-operative care	10
6	Post-transplantation complications (Excluding rejection)	12
7	Rejection	8
8	Failing graft management	10
9	Pancreas transplantation	5
10	Research, Ethics and Professionalism and Patient Safety	5
Total		100%

B. SOE

A SOE is characterized by face-to-face interactions between a candidate and one or more examiners. The test questions may be linked to patient cases, clinical charts, or other clinical materials. One or more cases can be included within a station that

addresses the same topic and domain of focus. The purpose of an oral examination is to explore a candidate's thinking process to assess skills such as critical reasoning, problem-solving, judgment, and ethics. It allows the evaluation of the candidate's ability to express ideas, synthesize material, and think on one's feet.

Please refer to the SCFHS general bylaws and executive policy of assessment for regulations and guidelines for the final clinical examination (available at www.scfhs.org).

C. Professional Attitude Assessment

Defined as the commitment to deliver the highest standards of ethical and professional behavior in all aspects of health practices; attitudes, knowledge and skills based on clinical and/or medical administrative competence; and ethical, societal, and legal duties resulting in the wise application of behaviors that demonstrate a commitment to excellence, respect, integrity, accountability and altruism (e.g., self-awareness, reflection, life-long learning, scholarly habits, and physical health for suitable practice). This is assessed using the final ITER.

Clinical/practical skill domains assessed in the SOE include:

A. Data-Gathering Skills

Defined as the candidates' ability to obtain and identify important information, correlate the clinical data to recommend appropriate testing. It includes interviewing and history taking.

B. Reasoning and Analytical Skills

Defined as the candidates' ability to rationalize recommended effective management plans, evaluate alternative plans, recognize indicators to different appropriate treatments based on relevant, correct clinical data interpretation.

C. Decision-Making Skills

Defined as the candidates' ability to formulate a logical diagnosis and identify immediate needs and make accurate inferences regarding the expected outcomes. It includes recognizing potential complications, risks, and benefits.

G. PROGRAM AND COURSE EVALUATION

The SCFHS applies various measures to evaluate the implementation of this curriculum. The training outcomes of this curriculum follow the quality assurance framework endorsed by the Central Training Committee of the SCFHS. Trainee assessment (both formative and summative) results are analyzed and mapped to the curriculum content. Other indicators that will be incorporated are as follows:

- a) Reports of the annual trainees' satisfaction
- b) Reports from trainees' evaluation of faculty members
- c) Reports from trainees' evaluation of rotations
- d) Reports from the annual survey of program directors'
- e) Data available from program accreditations
- f) Reports from direct field communications with trainees and trainers.

Goal-Based Evaluation: The achievement of intended milestones will be evaluated at the end of each stage to assess the progress of curriculum delivery, and any deficiencies will be addressed in the following stage utilizing the time devoted to trainee-selected topics and professional sessions.

In addition to subject-matter opinions and best practices from benchmarked international programs, the SCFHS will apply a robust method to ensure that this curriculum will utilize all the data available during the time of revising this curriculum in the future.

H. POLICIES AND PROCEDURES

This curriculum represents the means and materials and outlines the learning objectives with which trainees and trainers will interact to achieve the identified educational outcomes. The SCFHS has a full set of "General Bylaws of Training in Postgraduate Programs" and "Executive Policies" (published on the official SCFHS

website) that regulate all training-related processes. The general bylaws of training, assessment, and accreditation as well as executive policies on admission, registration, formative assessment and promotion, examination, trainees' representation and support, duty hours, and leaves are examples of regulations that need to be implemented. Under this curriculum, trainees, trainers, and supervisors must comply with the most updated bylaws and policies, which can be assessed online (on the official SCFHS website).



I. APPENDICES

Appendix A: Example of an academic half day activities

Date	Time	Topics	Presenters	Venue
	1330-1600	Regional Kidney Transplant Recipient Protocol		
	1330-1600	Regional Potential Kidney Donor Protocol		
	1330-1600	Options for patients with advanced kidney disease		
	1330-1600	Histocompatibility testing, cross matching, immune monitoring-1		
	1330-1600	Histocompatibility testing, cross matching, immune monitoring-2		
	1330-1600	The science of deceased donor kidney transplantation		
	1330-1600	Allocation of deceased donor kidneys		
	1330-1600	Immunosuppressive medications and protocols-1		
	1330-1600	Immunosuppressive medications and protocols-2		
	1330-1600	Living donor kidney transplantation		
	1330-1600	Evaluation of adult kidney transplant candidates		
	1330-1600	The transplant operation and its surgical complications		
	1330-1600	Post-transplant-the first 3 months		
	1330-1600	Post-transplant-long term management		
	1330-1600	Infections in kidney transplantation		

Date	Time	Topics	Presenters	Venue
	1330-1600	Kidney transplantation and liver disease		
	1330-1600	Diagnostic imaging in kidney transplantation and biopsy technique		
	1330-1600	Histopathology of kidney transplantation		
	1330-1600	Options for the diabetic kidney transplant candidate		
	1330-1600	Kidney transplantation in children		
	1330-1600	Psychiatric aspects of kidney transplantation		
	1330-1600	Organ transplant law and ethics		
	1330-1600	Nutrition in kidney transplant candidates		
	1330-1600	The declaration of Istanbul on organ trafficking and transplant tourism		
	1330-1600	Multiple choice questions-1		
	1330-1600	Multiple choice questions-2		
	1330-1600	Multiple choice questions-3		



Appendix B: Core Specialty Topics

❖ Medical evaluation of renal transplant candidate(s)

- Obtaining detailed history and physical examination
- Ordering laboratory and radiological investigations relevant to transplant evaluation
- Interpretation of history, physical examination, tissue typing and other investigations findings
- Identifying the etiology of original kidney disease
- Risk assessment of renal transplantation and recurrence of original kidney disease
- Screening and evaluation of malignancy pre-transplantation
- Screening of the infectious diseases pre-transplantation
- Assessment of liver disease in candidate with viral hepatitis
- Vaccination pre-transplantation
- Evaluation of cardiovascular system and possible undiagnosed or diagnosed coronary artery disease
- Evaluation of cerebrovascular and peripheral vascular disease
- Evaluation of urological issues
- Evaluation of risk factors related to specific patient characteristics such as age, frailty, obesity, hypotension, previous transplant candidates, candidates for other organ transplants, and highly sensitised patients
- Health education and assessment of adherence to medical regimens post transplantation

❖ Medical evaluation of living kidney donor candidate(s)

- Obtaining detailed history and physical examination
- Ordering laboratory and radiological investigations relevant to transplant evaluation
- Interpretation of history, physical examination, tissue typing and other investigation findings
- Assessment of intention to donate
- Psychological assessment
- Assessment of incentives of organ donation
- Selecting most suitable candidate
- Risk assessment of future development of hypertension, and diabetes mellitus post donor nephrectomy
- Assessment of renal function and covert renal disease
- Assessment of risk of development of renal disease post nephrectomy
- Vaccination pre-donation
- Screening and evaluation of malignancy pre-donation
- Identification of genetic disease
- Contraindication to living kidney donation
- Informed consent
- Counselling of donors with isolated medical abnormalities
- Health education



❖ Medical evaluation of pancreas transplant candidate(s)

- Obtaining detailed history and physical examination
- Ordering laboratory and radiological investigations relevant to transplant evaluation
- Interpretation of history, physical examination, tissue typing and other investigations findings
- Identifying the etiology of original kidney disease
- Risk assessment of renal transplantation and recurrence of original kidney disease
- Screening and evaluation of malignancy pre-transplantation
- Screening of the infectious diseases' pre-transplantation
- Assessment of liver disease in candidate with viral hepatitis
- Vaccination pre-transplantation
- Assessment of the type of diabetes mellitus in a potential pancreas transplant candidate
- Assessment of diabetes mellitus complications pre-transplantation
- Evaluation of cardiovascular system and possible undiagnosed or diagnosed coronary artery disease
- Evaluation of cerebrovascular and peripheral vascular disease
- Evaluation of urological issues
- Evaluation of risk factors related to specific patient characteristics such as age, frailty, obesity, hypotension, previous transplant candidates, candidates for other organ transplants, and highly sensitised patients
- Health education and assessment of adherence to medical regimens post transplantation

❖ Indications and contraindications for and kidney and pancreas-kidney transplantation

- Pre-emptive kidney transplantation and benefits of early referral
- Living donor kidney transplantation in comparison to deceased donor transplantation
- Pancreas transplantation in type 1 and 2 diabetes mellitus
- Age limits and major comorbidities in kidney and pancreas transplantation
- Contraindications in various cardiovascular disease
- Contraindication for transplantation in candidate(s) with recent and metastatic malignancies
- Contraindications for transplantation in candidate(s) with untreated current infections
- Non-adherence to medical regimen as a contraindication for transplantation

❖ Fundamentals in transplant immunology

- Basic principles of immunology in solid organ transplantation
- T-cell immunity
- B-cell immunity
- Mechanism of allograft rejection
- Role of anti-HLA antibodies in allograft rejection
- Role of DSA
- Surveillance for panel reactive antibodies (PRA)
- HLA typing techniques
- Crossmatch techniques and its interpretation
- Virtual crossmatch
- The concept of immunological tolerance

❖ Acute allograft rejections and dysfunction

- Diagnosis and treatment of acute cellular allograft rejection
- Diagnosis and treatment of acute antibody-mediated allograft rejection
- Management of delayed graft rejection



- Steroid sensitive vs steroid resistant allograft rejection
- Recurrence of glomerulonephritis or original cause and its management
- Microangiopathic hemolytic anemia and its management
- Urinary tract infections post kidney/pancreas transplantation
 - ❖ Chronic allograft dysfunction
- Recurrence of original disease
- Chronic antibody mediated rejection and its treatment
- Chronic glomerulopathy and its management
- Late acute cellular rejection
 - ❖ Post kidney and kidney-pancreas transplant surgical complications
- Renal artery thrombosis
- Renal vein thrombosis
- Pancreatic vessels thrombosis
- Primary non-functioning graft
- Urinary leaks
- Ureteric stenosis
- Urinary obstruction
- Lymphoceles post transplantation
- Hematomas post transplantation
- Surgical site wound infection
 - ❖ Detection, prophylaxis, and management of transplant related infectious diseases, such as BK virus nephropathy, CMV and other opportunistic infections
- Surveillance of post-transplant infections
- CMV prophylaxis and treatment
- Urinary tract infections
- BK virus surveillance and its management

- Other opportunistic infections like *Pneumocystis carinii* pneumonia and its prophylaxis and management
- High-risk patient for mycobacterial tuberculosis and its prophylaxis
- Management of immunosuppression in infected patients
- Vaccination post transplantation
- Management of viral infections post transplantation
 - ❖ Transplant related malignancies
- Malignancy screening post-transplantation
- Management of immunosuppression in patients with diagnosed malignancy
- Role of EBV in lymphoma post transplantation
 - ❖ Immunosuppressive medications
- Immunosuppressive agents in currently in clinical use, pharmacodynamics, pharmacokinetics, therapeutic drug level monitoring, adverse effects and drug interactions
- Biological immunosuppressive agents including monoclonal and polyclonal antibodies
- Intravenous immunoglobulins
- New and novel immunosuppressive and immunomodulating agents
- Selection of appropriate immunosuppressive medications according to immunological and medical risk profile
- Immunosuppressive protocol
 - ❖ Combined kidney and other organ transplantation
- Indication for combined organ transplantation
- Combined liver and kidney transplantation in decompensated liver disease and hereditary metabolic syndrome
- Combined kidney and heart transplant
- CKD in recipients of non-renal solid organ transplantation and hematopoietic stem cell transplantation
 - ❖ Post-transplant comorbidities



- Management of cardiovascular diseases post transplantation
- Risk modification of coronary artery disease post transplantation
- Management of new onset diabetes mellitus post kidney transplantation
- Osteoporosis post transplantation
- Management of hypertension
- Management of hyperlipidaemia
- Management of obesity
- Tertiary hyperparathyroidism post transplantation
 - ❖ Fertility, contraception and pregnancy post kidney and pancreas transplantation
- Causes and management of infertility in men and women after kidney transplantation
- Contraception and timing of pregnancy
- Risk of pregnancy to mother and fetus
- Management of pregnancy in kidney and kidney-pancreas transplant recipients
 - ❖ Highly sensitized renal transplant recipients
- Detection of anti-HLA antibodies pre-transplantation
- Indication for desensitization pre-kidney transplantation
- Applying various desensitization protocols in highly sensitized renal transplant recipients
- Use of plasma exchange/immunoadsorption in highly sensitized renal transplant recipients
- Treatment of antibody mediated rejection post transplantation in highly sensitized renal transplant recipients
- Protocol kidney transplant biopsy in highly sensitized recipients
 - ❖ ABO-incompatible kidney transplantation
- Indication of ABO-incompatible kidney transplantation
- Detection of isoagglutinin antibodies pre-transplantation
- Pre-transplant conditioning regimens

- Surveillance of post transplantation
- Treatment of antibody mediated rejection in the context of ABO-incompatible kidney transplantation
 - ❖ Kidney paired donation (KPD)
- Indications for paired kidney donation
- Different matching and optimisation of HLA matches
- Challenges associated with KPD
- Informed consent and counselling of transplant recipients and potential kidney donors
- Ethical issues related to KPD
 - ❖ Organ allocation strategies
- Principles of organ allocation
- Role of the SCOT
- Management of deceased donor waiting list
- Organ shortage
- Strategies to improve organ access to minority groups
 - ❖ Ethics of organ transplantation
 - ❖ Declaration of Istanbul on Organ Trafficking and Transplant Tourism
 - ❖ Cost issues in kidney and pancreas transplantation



Appendix C

ADULT TRANSPLANT NEPHROLOGY							
1-YEAR FELLOWSHIP TRAINING							
Assessment Tool	Program Requirement (number)	Details & Description (all per academic year)	Final Scoring				Score's Utility (Marking vs. Feedback)
			Clear Pass	Borderline Pass	Borderline Fail	Clear Fail	
			69.5%-100%	59.5-69.5%	59.4-50%	< 50%	
			# Performed / # required *100 %	# performed / # required *100 %	# performed / # required *100 %	# performed / # required *100 %	
Academic Activities							<u>Feedback</u>
CbD							<u>Feedback</u>
Logbook							<u>Feedback</u>
DOPs							<u>Feedback</u>
Mini-CEX							<u>Feedback</u>
ITERS							<u>Feedback</u>

The candidate must score a minimum of “borderline pass”.

The final score is based on feedback NOT markings. For further details, please refer to <https://scfhs.org.sa/ar/training>.

J. REFERENCES

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