PEDIATRIC ALLERGY AND IMMUNOLOGY
FELLOWSHIP CURRICULUM

2018


بسم الله الرحمن الرحيم

الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

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1. Introduction

1.1. Foreword

In this updated curriculum, we are adopting the CanMEDS framework, as it is an innovative, competency-based framework that describes the core knowledge, skills, and attitude of physicians. This curriculum is intended to provide a broad framework for fellows and faculty to focus on teaching and learning as well as clinical experience and professional development during the training program. This does not intend to be the sole source of defining what is to be taught and learned during the fellowship training. Fellows are expected to acquire knowledge and skills and develop appropriate attitudes and behaviors throughout their training program and take personal responsibility in learning. They must learn from every patient encounter, whether that condition or disease is mentioned in this curriculum.

This curriculum is part of strategic planning of the Saudi Commission for Health Specialties (SCFHS) to review and update the curricula of the training programs. The CanMEDS Framework has been integrated into the SCFHS accreditation standards for specialty and subspecialty training programs. It was developed and reviewed by the local fellowship programs directors, and international and local advisors.

SCFHS, as it is represented by the scientific board for Allergy/immunology Training Committee, are committed to providing full support for the implementation of the curriculum by way of allocating necessary resources, providing faculty development, and establishing a monitoring system. Further reinforcements and continuous quality improvement process through feedback from fellows, trainers, and program directors and site visits will be conducted by the Central Accreditation Committee and the Allergy/immunology Scientific Board.

1.2. Practice context

Historical background

Allergy and immunology as a subspecialty in Saudi Arabia stared with limited medical resources, and gradually was recognized as a sub-specialized area in medicine with the arrival of the first overseas trained physicians in the mid-1970s. A section for allergy and clinical immunology was established in 1984 in the Department of Pediatrics at King Faisal Specialist Hospital and Research Centre (KFSH&RC). Over the last 30 years, the clinical service expanded to provide inpatient and outpatient care for all allergic and immunological diseases for both pediatric and adult patients in multiple hospitals throughout the country.
The rapid growth of health services has also been accompanied by a planned process in developing labor to run such services. This is evident in investing in overseas scholarships and local training, especially after establishing the SCFHS, and implementation of structured training programs. A fellowship program in allergy and clinical immunology was first stared in the Kingdom of Saudi Arabia in 1988. It was the only program, and it was conducted in a single hospital—KFSH&RC in Riyadh city. The program was accredited by the SCFHS in 2009. Two training centers were accredited to join the fellowship program: King Fahad Medical City and King Khalid University Hospital in 2014 and 2015, respectively. Thirty-eight physicians have graduated from the program to date.

1.3. Nature and scope of the practice

Allergy and clinical immunology are two fields in medicine that share common ground. The underlying pathophysiology for most diseases in this field of medicine is the result of an abnormal immunological response to environmental allergies leading to allergic disease, an immunologic dysregulation leading to autoimmunity, or a defect in the host defense to pathogens in patients with primary immunodeficiency. Therefore, the subspecialty of allergy and clinical immunology encompasses three major clinical areas: allergic diseases and asthma, autoimmunity disorders, and immunodeficiency diseases.

Training programs in most countries combine the two related subspecialty areas in medicine in a single fellowship program. Training in allergy and clinical immunology as a medical subspecialty is concerned with the investigation, diagnosis, and medical management of conditions involving the immune system, with an emphasis on allergic, autoimmune, and immunodeficiency diseases.

It is the intention of the training program to train fellows as expert consultants in all these areas. Consequently, fellows trained in the physiology, pathology, differential diagnosis, and treatment of such diseases understand the therapeutic modalities including mechanisms of action, dosing, adverse effects, and costs of therapy.

Diseases with an allergic etiology can affect many organ systems and occur in response to a wide variety of genetic and environmental factors. Patients with allergic diseases are among the most common causes of chronic medical problems in both adults and children. Allergic diseases include, among others, asthma, rhino conjunctivitis, otitis, rhinosinusitis, urticaria, angioedema, eczema, food allergy, drug allergy, insect allergy, occupational allergic diseases, and anaphylaxis.

On the other hand, the clinical immunology diseases in the training program are related to patients with primary immunodeficiency. Primary immunodeficiency diseases (PID) are a group of heterogeneous disorders resulting mostly from a genetic defect leading to a deficiency in the host defense system against infections. Affected patients are, therefore, prone to recurrent infections. In addition to susceptibility to microbial infection, the other noninfectious manifestation is related to disturbed immune regulation. Such dysregulation might cause lymphoproliferative and/or autoimmune manifestations. Patients with PID include those with combined immunodeficiencies, well-defined syndromes with immunodeficiency, predominately antibody deficiencies, immune dysregulation diseases, congenital defects of phagocyte, defects in innate immunity, auto inflammatory disorder, or complement deficiencies. PID are common in Saudi Arabia because of high consanguinity and the high risk for autosomal recessive inherited disease in our population. Other clinical immunology relates to immune system dysfunctions and immunologically mediated diseases and are a component of organ-specific specialties such as dermatology, pulmonology, rheumatology, and gastroenterology. Fellows will spend time rotating in these subspecialties.

Preventive healthcare, ethical issues, and discussions of the cost and benefits of diagnostic tests, procedures, and therapies will be an integral part of the fellows' training throughout the two years of training. The program will provide educational experiences that prepare fellows to be competent and able to provide comprehensive, coordinated care to a broad range of patients with allergy/immunology concerns. Fellows will be given the opportunity to function with other healthcare professionals (nursing, pharmacists, social worker, case manager, etc.) in both inpatient and ambulatory settings to become proficient as leaders in the organization and bring systematic improvement of the processes of patient care.

1.4. Practice profile

Allergists/immunologists are subspecialists who focus on the investigation, diagnosis and medical management of conditions involving the immune system, with an emphasis on allergic, autoimmune, and immunodeficiency diseases. This will also involve a broader aspect of the physical, emotional, and social health of patients. This specialty deals with health promotion and prevention, and the detection and management of allergic and immunologic diseases. The ability to communicate effectively with patients, families, and social service professionals is the key to providing effective patient care.

Allergists/immunologists work closely with a large network of physicians and other healthcare professionals. Allergy/immunology provides a fair degree of flexibility in the type of practice; some allergists/immunologists are affiliated with community hospitals in either the public or private sector, and they have consulting practices that focus more on allergic diseases. Others are affiliated with tertiary care centers or academic centers where patients are referred for more advanced workup and management. There are an increasing number of recognized center that provide an opportunity to combine clinical and basic/clinical scientific research with the delivery of highly specialized care for patients with allergic or immunologic diseases.

1.5. Fellowship program structure

The pediatric allergy/immunology training program consists of well-structured, full-time, supervised, 2-years training after completing residency in general pediatrics. This training includes the following:

- **Core rotations**
    - First-year fellow rotations
    - Second-year fellow rotations
    - Increasing responsibility to include supervisory for joiner, senior resident, and interns
    - Management of hospitalized and ambulatory patients
    - Clinic hospital-based outpatient allergy/immunology
    - Inpatients wads
    - Day service: may include emergency room (ER), day medical unit, etc.
    - Subspecialty and other rotations, appropriate to allergy immunology subspecialties:
        - Adult allergy/immunology
        - Pediatric bone marrow transplantation
        - Pediatric rheumatology
        - Community allergy/immunology
        - Immunopathology lab
- **Electives**

Elective rotations allow fellows the flexibility to gain a concentrated experience in an area related to pediatric allergy/immunology; as pediatric pulmonology pediatric infectious diseases or dermatology.

Required rotations for each year

1st Year	
Allergy and clinical immunology service (ward and in-patient consult, clinics, ER, and/or day service)	9 months
Diagnostic allergy and immunology laboratory	1 month
Adult allergy/immunology	1 month
Vacation	1 month

2nd Year	
Allergy and clinical immunology service (ward and in-patient consult, clinics, ER, and/or day service)	6 months
Bone marrow transplantation	1 month
Pediatrics rheumatology	1 month
Elective (community allergy, pulmonary, derma, infectious diseases, ear-nose-throat, or research)	3 months
Vacation	1 month

1.6. Differences between previous and current curriculum

Philosophical orientations
- Competency-based
- Graded responsibility for the physicians
- Better supervisory frameworks
- Clearer demarcation of what should be achieved at each stage of training
- Core curriculum with elective options
- Independent learning within a formal structure

Expanded range of competencies
- Balanced representation of knowledge, skills, and professionalism
- Incorporation of new knowledge and skills

Evidence-based approach
- Demographic data (e.g., disease prevalence)
- Practice data (e.g., procedure performed)
- Patient profile (e.g., outpatient versus inpatient)
- Catering to future needs

Holistic assessment
- Higher emphasis on continuous assessment
- Balanced assessment methods
- Portfolio and logbook to support learning and individualized assessment
- In-built formative assessment

2. Outcomes and Competencies

2.1. Rationale

Allergy and immunology is a medical subspecialty concerned with the investigation, diagnosis and medical management of conditions involving the immune system, with an emphasis on allergic, autoimmune, and immunodeficiency diseases.

The subspecialty of clinical immunology and allergy encompasses three major clinical areas:
- Allergic diseases including asthma, allergic rhinitis, and eczema;
- Immunoregulatory disorders; and
- Immunodeficiency diseases

It is the intention of allergy and immunology fellowship programs to train fellows as expert consultants and accomplished practitioners in all these areas.

Training programs may vary their emphasis based on mission, expertise, and resources. It is expected that all fellows be trained in the physiology, pathology, differential diagnosis, and treatment of such diseases with understanding of the therapeutic modalities including mechanisms of action, dosing, adverse effects, and therapy costs.

2.2. Overall goal

Upon completion of training, a fellow is expected to be a competent subspecialist in allergy and immunology capable of assuming a consultant's role in the discipline. The fellow must acquire a working knowledge of the theoretical basis of the discipline, including its foundations in the basic medical sciences and research.

2.3. Learning outcomes

– Fellows must demonstrate the requisite knowledge, skills, and attitudes for effective patient-centered care and service to a diverse population.
– Fellows should have supervised clinical experience and opportunities in the clinical immunology and allergy services in pediatrics with a major emphasis on allergic, autoimmune, and immunodeficiency diseases.
– There should be opportunity to experience both outpatient consultation clinics and in-hospital consultations.
– Fellows must become fully familiar with the methodology, application, and interpretation of a wide variety of investigative/diagnostic tests applicable to the practice of clinical immunology and allergy.
– Fellows must participate actively in the academic activities of their program.

2.4. Generic competencies

Medical expert

Definition: As *medical experts*, clinical immunologists and allergists integrate all the roles, applying medical knowledge, clinical skills, and professional attitudes in their provision of patient-centered care. A medical expert is the central role in this framework.

Key and enabling competencies: clinical immunologists and allergists can…

1. Function effectively as consultants to provide optimal, ethical, and patient-centered medical care

1.1. Perform a clinical immunology and allergy consultation, including the presentation of well-documented assessments and recommendations in written and/or verbal form in response to a request from another healthcare professional
1.2. Demonstrate use of all competencies relevant to clinical immunology and allergy
1.3. Identify and appropriately respond to relevant ethical issues arising in patient care
1.4. Demonstrate the ability to prioritize professional duties when faced with multiple patients and problems
1.5. Demonstrate compassionate and patient-centered care
1.6. Recognize and respond to the ethical dimensions in medical decision-making
1.7. Demonstrate medical expertise in situations other than patient care, such as providing expert legal testimony or advising governments, as needed

2. Establish and apply the clinical, socio-behavioral, and fundamental biomedical science knowledge, skills, and attitudes relevant to clinical immunology and allergy

2.1. Describe the pathophysiology, signs, and symptoms of allergic, autoimmune and immunodeficiency diseases

Basic science

2.1.1. Overview of the immune system: organization and function of the different components of the immune system
2.1.1.1. Thymic development
2.1.1.2. Cutaneous immunity
2.1.1.3. Intestinal/mucosal immunity
2.1.1.4. Immune functions of cellular elements of the immune system
2.1.1.4.1. T cells
2.1.1.4.2. B cells
2.1.1.4.3. Natural killer (NK) cells/NKT cells
2.1.1.4.4. Lymphokine-activated killer (LAK) cells
2.1.1.4.5. Monocytes/macrophages/dendritic cells (antigen-presenting cells)
2.1.1.4.6. Mast cells/basophils
2.1.1.4.7. Eosinophils
2.1.1.4.8. Neutrophils
2.1.1.4.9. Platelets
2.1.1.4.10. Endothelial/epithelial/smooth muscle/fibroblasts
2.1.2. Immune mechanisms
2.1.2.1. Innate versus adaptive immunity
2.1.2.1.1. Complement
2.1.2.1.2. Pattern recognition receptors
2.1.2.1.3. Natural antimicrobial agents
2.1.2.2. Major histocompatibility complex – molecular structure and function
2.1.2.3. Immunogenetics – gene rearrangements in the generation of immune system diversity
2.1.2.4. Antigen-presenting cells – processing conventional and superantigens
2.1.2.5. Gell and Coombs classification of immune responses

2.1.2.5.1. Type I –immediate hypersensitivity response
2.1.2.5.1.1. IgE/allergen binding/signal transduction/relevant mediators/effects on target organs
2.1.2.5.1.2. Early and late phase reactions
2.1.2.5.2. Type II – antibody mediated cytolysis
2.1.2.5.3. Type III – immune-complex mediated reactions
2.1.2.5.4. Type IV – cell mediated response
2.1.2.6. T-cell mediated immunity
2.1.2.6.1. T-cell activation – T-cell receptor structure and function
2.1.2.6.2. Cytokines and co-stimulatory molecules
2.1.2.6.3. Antigen presenting cells-properties and function
2.1.2.6.4. T-cell subsets
2.1.2.6.5. Regulatory and memory T-cells
2.1.2.6.6. NK/NKT cells/LAK cells
2.1.2.7. B-cell mediated immunity
2.1.2.7.1. B-cell activation and epitope recognition
2.1.2.7.2. Cytokines and signal transduction
2.1.2.7.3. B-cell maturation and antibody response
2.1.2.7.4. Biologic processes initiated by antibody: opsonization, complement fixation, cytokines, signal transduction
2.1.2.8. Effector mechanisms
2.1.2.8.1. Chemokines/cytokines
2.1.2.8.2. Relevant cells/adhesion molecules
2.1.2.9. Immunologic memory
2.1.3. Mucosal Immunity
2.1.3.1. Innate defenses
2.1.3.1.1. Epithelia
2.1.3.1.2. Complement/defensins
2.1.3.1.3. Mucosal immunoglobulins
2.1.3.2. Adaptive immunity
2.1.3.2.1. Responses to bacteria, viruses, and parasites
2.1.4. Transplantation immunology
2.1.4.1. Principles of graft rejection and tolerance
2.1.4.2. Graft versus host reactions (GVHR)
2.1.5. Tumor immunology
2.1.5.1. Tumor-specific and tumor-associated antigens
2.1.5.2. Oncogenes, translocations, and tumor suppressor genes
2.1.6. Immunoregulatory mechanisms
2.1.6.1. Tolerance
2.1.6.2. Idiotypic networks
2.1.6.3. Apoptosis
2.1.6.4. Anergy

Anatomy and physiology

2.1.7. Normal anatomy and physiology
2.1.7.1. Upper airway -nose, sinuses, middle ear
2.1.7.2. Lower airway
2.1.7.3. Skin
2.1.7.4. Gastrointestinal tract
2.1.7.5. Lymphoid tissue

2.1.8. Pathology of primary atopic disorders
- 2.1.8.1. Asthma
- 2.1.8.2. Rhinitis/rhinosinusitis/nasal polyps
  - 2.1.8.2.1. Allergic/non-allergic
- 2.1.8.3. Atopic dermatitis
- 2.1.8.4. Early and late phase allergic responses
  - 2.1.8.4.1. Nasal challenge
  - 2.1.8.4.2. Bronchial challenge
  - 2.1.8.4.3. Cutaneous
- 2.1.8.5. Role of structural cells
  - 2.1.8.5.1. Epithelium
  - 2.1.8.5.2. Endothelium
  - 2.1.8.5.3. Smooth muscle
  - 2.1.8.5.4. Fibroblasts
  - 2.1.8.5.5. Mucociliary cells

Pharmacology

2.1.9. Pharmacology, including mechanisms, action, dosing, and therapy costs
- 2.1.9.1. Glucocorticoids
- 2.1.9.2. Beta-agonists and antagonists
- 2.1.9.3. Mast cell active agents (Cromolyn/Nedocromil)
- 2.1.9.4. Cyclooxygenase and leukotriene pathway modulators
- 2.1.9.5. Anticholinergics
- 2.1.9.6. Theophylline
- 2.1.9.7. Antihistamines
- 2.1.9.8. Immunomodulatory/immunosuppressive medications
- 2.1.9.9. Aerosolized respiratory treatments and reagents
- 2.1.9.10. Topical dermatologic and ophthalmologic therapies
- 2.1.9.11. Vaccines against transmissible agents
- 2.1.9.12. Drug interactions
- 2.1.9.13. Alternative therapies in clinical immunology and allergy

Therapeutics

2.1.10. Principles of allergen avoidance
2.1.11. Immunoglobulin replacement therapy
2.1.12. Theory and practice of allergen immunotherapy
2.1.13. Cytokine and cytokine receptor-mediated therapy including, but not limited to:
- 2.1.13.1. Interferon-gamma
- 2.1.13.2. Granulocyte colony-stimulating factor
- 2.1.13.3. Interleukin-2
- 2.1.13.4. Anti-tumor necrosis factor

2.1.14. Nucleic acid-based therapies (DNA vaccines, cytosine-phosphate-guanine, gene insertion, antisense nucleotides
2.1.15. Cellular immune reconstitution/bone marrow transplantation
2.1.16. Plasmapheresis and cytapheresis
2.1.17. Surgical intervention with sinuses/middle ear
2.1.18. Recombinant molecules and humanized monoclonal antibodies (imatinib, infliximab, omalizumab, rituximab)
2.1.19. Probiotics

2.1.20. Allergenic proteins and extracts for diagnosis and treatment
- 2.1.20.1. Inhalant allergens
  - 2.1.20.1.1. Pollens/molds
  - 2.1.20.1.2. House dust mites
  - 2.1.20.1.3. Animals
  - 2.1.20.1.4. Aerobiology and environmental assessment of allergens
- 2.1.20.2. Stinging insects and arachnids
- 2.1.20.3. Allergen extract preparation and standardization methods

Specific diagnostics

2.1.21. Allergy skin tests-epicutaneous and intracutaneous, including, but not limited to, inhalants, foods, drugs, latex, and venoms

2.1.22. Theory of nasal allergen provocation and cytology

2.1.23. Measurements and interpretation of lower airway function testing
- 2.1.23.1. Spirometry: FVC, FEV1, FEV/FVC, FEF 25-75, flow volume loop, pre- and post-bronchodilator values
- 2.1.23.2. Provocative challenges—indications, performance, and interpretation, including, but not limited to, exercise, methacholine, and allergens
- 2.1.23.3. Exhaled breath analysis

2.1.24. Interpretation of chest x-ray/computed tomography (CT) scan

2.1.25. Demonstrate understanding of upper airway imaging, including interpretation of sinus x-rays/CT scan

2.1.26. Theory of induced sputum analysis

2.1.27. Mucociliary function

2.1.28. Theory and practice of food and drug challenges

2.1.29. Clinical examination of the nose, including principles of rhinoscopy, eyes, ears, chest, and skin

2.1.30. Environmental assessment

Clinical sciences

2.1.31. Demonstrate knowledge of etiology, pathophysiology, diagnostic methods, assessment, and practical management of the following:
- 2.1.31.1. Allergic diseases and related disorders
  - 2.1.31.1.1. Upper airway disease
    - 2.1.31.1.1.1. Rhinitis (allergic and non-allergic)
    - 2.1.31.1.1.2. Sinusitis
    - 2.1.31.1.1.3. Nasal polyposis
    - 2.1.31.1.1.4. Otitis
    - 2.1.31.1.1.5. Laryngeal disorders
  - 2.1.31.1.2. Ocular disease
    - 2.1.31.1.2.1. Allergic and vernal conjunctivitis, iritis
  - 2.1.31.1.3. Dermatologic diseases
    - 2.1.31.1.3.1. Atopic dermatitis
    - 2.1.31.1.3.2. Contact dermatitis
    - 2.1.31.1.3.3. Urticaria and angioedema
    - 2.1.31.1.3.4. Stevens Johnson syndrome and toxic epidermal necrolysis
    - 2.1.31.1.3.5. Blistering diseases
  - 2.1.31.1.4. Lower respiratory tract disease
    - 2.1.31.1.4.1. Asthma (pediatric and adult)
    - 2.1.31.1.4.2. Exercise induced asthma

2.1.31.1.4.3. Aspirin-exacerbated respiratory disease
2.1.31.1.4.4. Allergic bronchopulmonary aspergillosis
2.1.31.1.4.5. Hypersensitivity pneumonitis
2.1.31.1.4.6. Chronic obstructive pulmonary disease
2.1.31.1.4.7. Cystic fibrosis
2.1.31.1.4.8. Sarcoidosis
2.1.31.1.4.9. Occupational asthma
2.1.31.1.4.10. Cough syndromes
2.1.31.1.4.11. Interstitial lung disease
2.1.31.1.5. Drug allergy
2.1.31.1.5.1. Mechanisms of adverse drug reactions
2.1.31.1.5.2. ASA and nonsteroidal anti-inflammatory drug reactions
2.1.31.1.5.3. Vaccine reactions
2.1.31.1.5.4. Antibiotics
2.1.31.1.5.5. Latex
2.1.31.1.5.6. Local and general anesthetics
2.1.31.1.6. Adverse reactions to ingestants
2.1.31.1.6.1. Food adverse reactions, including, but not limited to, IgE mediated, food intolerance, and gluten sensitivity
2.1.31.1.6.2. Food additive reactions
2.1.31.1.6.3. Eosinophilic esophagitis and gastroenteritis
2.1.31.1.7. Anaphylaxis and anaphylactoid reactions
2.1.31.1.7.1. Causes, including, but not limited to ingestants, exercise, allergen immunotherapy, latex, and radiocontrast media
2.1.31.1.7.2. Clinical and laboratory evaluation
2.1.31.1.7.2.1. Acute treatment
2.1.31.1.7.2.2. Long term treatment, including, but not limited to, patient education and use of epinephrine
2.1.31.1.8. Insect hypersensitivity
2.1.31.1.8.1. Classes of insects associated with hypersensitivity
2.1.31.1.8.2. Skin tests and in vitro testing to stinging insects
2.1.31.1.8.3. Practice of venom immunotherapy
2.1.31.1.9. Economic costs of allergic diseases
2.1.31.1.10. Psychosocial aspects of allergic diseases and adherence to therapy
2.1.31.1.11. Immunodeficiency diseases
2.1.31.1.11.1. Combined immunodeficiency syndromes
2.1.31.1.11.1.1. Predominant antibody deficiencies
2.1.31.1.11.1.2. Other well-defined immunodeficiency syndromes
2.1.31.1.11.1.3. Complement deficiencies including hereditary/acquired C1 inhibitor deficiency
2.1.31.1.11.1.4. Defects of phagocytic number and function
2.1.31.1.12. Secondary immunodeficiency diseases
2.1.31.1.12.1. Infection (acquired immune deficiency syndrome and others)
2.1.31.1.12.2. Nutrition/malignancy
2.1.31.1.12.3. Iatrogenic
2.1.31.1.12.4. Clinical skills for diagnosis and treatment
2.1.31.1.13. Immunoregulatory disorders
2.1.31.1.13.1. Vasculitides (small, medium, and large vessels)
2.1.31.1.13.2. Immune rheumatic disorders

2.1.31.1.13.3. Immune renal disorders
2.1.31.1.13.4. Immune endocrine and reproductive disorders
2.1.31.1.13.5. Immune pulmonary disorders
2.1.31.1.13.6. Immune gastrointestinal and hepatobiliary disorders
2.1.31.1.13.7. Immune neurologic and neuromuscular disorders
2.1.31.1.13.8. Immune hematologic disorders
2.1.31.1.14. Transplantation medicine
2.1.31.1.14.1. Alloreactive T-cell activation and recognition of alloantigens
2.1.31.1.14.2. Allograft rejection, prevention, and treatment
2.1.31.1.14.3. Graft-versus-host-disease: acute and chronic
2.1.31.1.14.3.1. Prevention/treatment
2.1.31.1.15. Immune system related malignancies and cellular disorders
2.1.31.1.15.1. B-cell and plasma-cell neoplasms
2.1.31.1.15.2. T-cell neoplasms
2.1.31.1.15.3. Monocyte/macrophage neoplasms
2.1.31.1.15.4. Mast cell dyscrasias
2.1.31.1.15.5. Eosinophilic disorders
2.1.31.1.15.6. Cryopathies and amyloid

2.1.32. Describe the principles and methodology of laboratory techniques used in clinical immunology and allergy and discuss the indications for, and the limitations of, and immunologic basis of common diagnostic tests:
2.1.32.1. Measurement and interpretation of immunoglobulins (total and specific) and subclasses
2.1.32.2. Interpretation of serum protein electrophoresis and immunoelectrophoresis
2.1.32.3. Interpretation of lymphocyte subsets
2.1.32.4. Serologic testing
2.1.32.4.1. Enzyme-linked immunosorbent assay, immunoblot
2.1.32.4.2. Autoimmune serology
2.1.32.4.3. In vitro testing for specific IgE
2.1.32.4.4. Radioallergosorbent inhibition
2.1.32.4.5. Serologic testing for infectious disease
2.1.32.5. Flow cytometry
2.1.32.6. Cellular functional responses
2.1.32.7. Chemotaxis and adhesion
2.1.32.7.1. Mitogen or antigen induced proliferation and activation
2.1.32.7.2. Phagocytosis and intracellular killing
2.1.32.7.3. Cellular cytotoxicity
2.1.32.8. Measurement of immune complexes, cryoprecipitable proteins, total serum complement, complement components and C1 inhibitor assays
2.1.32.9. Histocompatibility typing
2.1.32.10. Genetic techniques including polymerase chain reaction and use of probes
2.1.32.11. Monoclonal antibody technology
2.1.32.12. Cytokine and mediator measurement
2.1.32.13. Unsupported and inappropriate diagnostic tests for allergic and immune deficiency diseases

2.1.33. Discuss the immunologic basis and mechanisms of treatments defining clinical immunology and allergy, including but not limited to allergen immunotherapy, desensitization, and allergen challenge and immunomodulatory therapies

2.2. Apply lifelong learning skills of the scholar role to keep up-to-date and enhance areas of professional competence
2.3. Contribute to the enhancement of quality care and patient safety in clinical immunology and allergy, integrating the best available evidence and practice

3. Perform a complete and appropriate assessment of a clinical immunology and allergy patient
3.1. Identify and explore issues to be addressed in a patient encounter effectively, including patients' context and preferences
3.2. Conduct a history that is relevant, concise, clear, and accurate to context and preferences (including, but not limited to, potential allergic and non-allergic triggers and environmental/workplace history)
3.3. Perform a relevant and accurate focused physical examination for the purposes of prevention and health promotion, diagnosis and/or management
3.4. Select medically appropriate investigative methods in a resource-effective and ethical manner
3.5. Demonstrate effective clinical problem-solving skills including appropriate interpretation of available data.

4. Use preventive and therapeutic interventions effectively
4.1. Implement a management plan in collaboration with patient and their families
4.2. Develop an appropriate plan for investigation and management of a child or adult with an allergic, autoimmune, and immunodeficiency disease.
4.3. Demonstrate appropriate and timely application of preventive and therapeutic interventions relevant to clinical immunology and allergy
4.3.1. Environmental control of the home and workplace
4.3.2. Disease specific action plan (including, but not limited, to asthma and anaphylaxis)
4.3.3. Education regarding the appropriate use of allergic disease specific devices (including, but not limited, to auto injectors and inhalers)
4.3.4. Immunomodulatory therapy (including anti IgE)
4.3.5. Immunoglobulin replacement therapy
4.4. Demonstrate how appropriate informed consent is obtained for therapies

5. Demonstrate proficient and appropriate use of procedural skills, both diagnostic and therapeutic
5.1. Demonstrate effective, appropriate, and timely performance of diagnostic procedures relevant to clinical immunology and allergy, including the following:
5.1.1. Epicutaneous and intradermal allergy tests
5.1.2. Patch testing
5.1.3. Allergen immunotherapy
5.1.4. Food challenge
5.1.5. Medication challenge/desensitization
5.1.6. Inhalant immunotherapy
5.1.7. Venom immunotherapy
5.2. Obtain appropriate informed consent for procedures where applicable
5.3. Document and disseminate information related to procedures performed and their outcomes
5.4. Arrange adequate follow-up where appropriate for procedures performed

6. Recognize the limits of their own expertise and seek appropriate consultation from other health professionals
6.1. Demonstrate effective, appropriate, and timely consultation of another health professional as needed for optimal patient care
6.2. Arrange appropriate follow-up care services for a patient and their family

Communicator

***Definition*:** As *communicators*, clinical immunologists and allergists effectively facilitate the doctor-patient relationship and the dynamic exchanges that occur before, during, and after the medical encounter.

Key and enabling competencies: clinical immunologists and allergists can…

1. Develop rapport, trust, and ethical therapeutic relationships with patients and families
    1.1. Recognize that being an effective communicator is a core clinical skill for physicians, and that effective physician-patient communication can foster patient and physician satisfaction, adherence and improved clinical outcomes
    1.2. Establish positive therapeutic relationships with patients and their families that are characterized by understanding, trust, respect, honesty, and empathy
    1.3. Respect patient confidentiality, privacy, and autonomy
    1.4. Listen effectively
    1.5. Be aware of and respond appropriately to nonverbal cues
    1.6. Facilitate an effective structured clinical encounter
2. Accurately elicit and synthesize relevant information and perspectives of patients and families, colleagues, and other professionals
    2.1. Gather information about a disease and about a patient's beliefs, concerns, expectations and illness experience
    2.2. Seek out and synthesize relevant information from other sources where appropriate, such as a patient's family, caregivers and other professionals
3. Convey relevant information and explanations accurately to patients and families, colleagues, and other professionals
    3.1. Deliver information to a patient and family, colleagues, and other professionals in a humane manner and in such a way that it is understandable, encourages discussion and participation in decision-making
4. Develop a common understanding on issues, problems and plans with patients, families, and other professionals to develop a shared plan of care
    4.1. Identify and explore problems to be addressed from a patient encounter effectively, including the patient's context, responses, concerns, and preferences
    4.2. Respect diversity and difference, including but not limited to the impact of sex, religion, age, culture, and ethnicity on decision-making
        4.2.1. Give appropriate advice (including but not limited to allergen avoidance and pharmacologic/immunologic treatment), which includes consideration of patients' sex, religion, age, culture, and ethnicity
    4.3. Encourage discussion, questions, and interaction in the encounter
    4.4. Engage patients, families, and relevant health professionals in shared decision making to develop a plan of care
    4.5. Address challenging communication issues effectively, such as obtaining informed consent, delivering bad news, and addressing anger, confusion, and misunderstanding
        4.5.1. Demonstrate skills in working with others who present significant communication challenges such as anger or confusion, or an ethno-cultural background different from the physician's own
5. Convey effective oral and written information about a medical encounter
    5.1. Maintain clear, accurate, and appropriate records (written or electronic) of clinical encounters and plans
    5.2. Present verbal reports of clinical encounters and plans
    5.3. Complete patient instruction forms (including an asthma action plan) as applicable
    5.4. Present medical information effectively to the public or media about a medical issue

Collaborator

Definition: As *collaborators*, clinical immunologists and allergists effectively work within a healthcare team to achieve optimal patient care.

Key and enabling competencies: clinical immunologists and allergists can…

1. Participate effectively and appropriately in an interprofessional healthcare team
    1.1. Describe the clinical immunology and allergy subspecialist's roles and responsibilities to other professionals
    1.2. Describe the roles and responsibilities of other professionals within the healthcare team, including allergy clinic nurses, infusionists, asthma educators, dieticians, pharmacists, school personnel, and workplace safety insurance boards
    1.3. Recognize and respect the diversity of roles, responsibilities, and competencies of other professionals in relation to their own
    1.4. Work with others to assess, plan, provide and integrate care for individual patients (or groups of patients)
    1.5. Work with others to assess, plan, provide and review other tasks, such as research problems, educational work, program review or administrative responsibilities
    1.6. Participate in inter-professional team meetings
    1.7. Enter relationships with other professions for the provision of quality care
    1.8. Describe the principles of team dynamics
    1.9. Respect team ethics, including confidentiality, resource allocation, and professionalism
    1.10. Demonstrate leadership in a healthcare team, as appropriate
2. Work with other health professionals effectively to prevent, negotiate, and resolve interprofessional conflict
    2.1. Demonstrate a respectful attitude towards other colleagues and members of an interprofessional team
    2.2. Work with other professionals to prevent conflicts
    2.3. Employ collaborative negotiation to resolve conflicts
    2.4. Respect differences and address misunderstandings and limitations in other professionals
    2.5. Recognize one's own differences, misunderstanding and limitations that may contribute to interprofessional tension
    2.6. Reflect on interprofessional team function

Leader

Definition: As a *leader*, clinical immunologists and allergists are integral participants in healthcare organizations, organizing sustainable practices, making decisions about allocating resources, and contributing to the effectiveness of the healthcare system.

Key and enabling competencies: clinical immunologists and allergists can…

1. Participate in activities that contribute to the effectiveness of their healthcare organizations and systems
    1.1. Work collaboratively with others in their organizations
    1.2. Participate in systemic quality evaluation and improvement, such as patient safety initiatives, quality improvement and risk management
    1.3. Describe the structure and function of the healthcare system as it relates to clinical immunology and allergy, including the roles of physicians
    1.4. Describe principles of healthcare financing, including physician remuneration, budgeting, and organizational funding

2. Manage their practice and career effectively
    2.1. Set priorities and manage time to balance patient care, practice requirements, outside activities and personal life
    2.2. Manage a practice including finances and human resources
    2.3. Implement processes to ensure personal practice improvement
    2.4. Employ information technology appropriately for patient care
3. Allocate finite healthcare resources appropriately
    3.1. Recognize the importance of just allocation of healthcare resources, balancing effectiveness, efficiency, and access with optimal patient care
    3.2. Apply evidence and management processes for cost-appropriate care
4. Serve in administration and leadership roles, as appropriate
    4.1. Chair or participate effectively in committees and meetings
    4.2. Lead or implement change in healthcare
    4.3. Plan relevant elements of healthcare delivery (work schedules)

Health Advocate

Definition: As *health advocates*, clinical immunologists and allergists responsibly use their expertise and influence to advance the health and well-being of individual patients, communities, and populations.

Key and enabling competencies: clinical immunologists and allergists can…

1. Respond to individual patient health needs and issues as part of patient care
    1.1. Identify the health needs of an individual patient
    1.2. Identify opportunities for advocacy, health promotion and disease prevention with individuals and their families
2. Respond to the health needs of the communities that they serve
    2.1. Describe the practice communities that they serve
    2.2. Identify opportunities for advocacy, health promotion and disease prevention in the communities that they serve, and respond appropriately
    2.3. Appreciate the possibility of competing interests between the communities served and other populations
3. Identify the determinants of health for the populations that they serve
    3.1. Identify the determinants of health of the populations, including barriers to access to care and resources
        3.1.1. Use evidence-based approach to identify determinants of health
    3.2. Identify vulnerable or marginalized populations within those served and respond appropriately
        3.2.1. Identify populations at risk for allergic/immunologic diseases and apply current evidence on treatment and prevention
4. Promote the health of individual patients, communities, and populations
    4.1. Describe an approach to implementing a change in a determinant of health of the populations they serve
    4.2. Describe how public policy impacts on the health of the populations served
        4.2.1. Describe how public health policy is developed
        4.2.2. Identify how current policies affect patients with allergic and immunologic diseases
        4.2.3. Demonstrate how policies can be changed because of physicians' actions
    4.3. Identify points of influence in the healthcare system and its structure
        4.3.1. Describe key issues in the Saudi healthcare system
        4.3.2. Describe how healthcare system changes might affect societal health outcomes

4.3.3. Advocate to decrease the burden of illness
4.3.4. Demonstrate effective use of a relevant specialty society, community-based advocacy group, other public education bodies, or private organizations
4.4. Describe the ethical and professional issues inherent in health advocacy, including altruism, social justice, autonomy, integrity, and idealism
4.5. Appreciate the possibility of conflict inherent in their role as a health advocate for a patient or community with that of manager or gatekeeper
4.6. Describe the role of the medical profession in advocating collectively for health and patients' safety

Scholar

Definition: As *scholars*, clinical immunologists and allergists demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application, and translation of medical knowledge.

Key and enabling competencies: clinical immunologists and allergists can…

1. Maintain and enhance professional activities through ongoing learning
   1.1. Describe the principles of maintenance of competence
   1.2. Describe the principles and strategies for implementing a personal knowledge management system
   1.3. Recognize and reflect on learning issues in practice
   1.4. Conduct a personal practice audit
   1.5. Pose an appropriate learning question
   1.6. Access and interpret the relevant evidence
   1.7. Integrate new learning into practice
   1.8. Evaluate the impact of any change in practice
   1.9. Document the learning process
2. Critically evaluate medical information and its sources, and apply this appropriately to practice decisions
   2.1. Describe the principles of critical appraisal
   2.2. Critically appraise retrieved evidence to address a clinical question
   2.3. Integrate critical appraisal conclusions into clinical care
3. Facilitate the learning of patients, families, students, residents, other health professionals, the public, and others, as appropriate
   3.1. Describe principles of learning relevant to medical education
   3.2. Identify collaboratively the learning needs and desired learning outcomes of others
   3.3. Select effective teaching strategies and content to facilitate others' learning
   3.4. Demonstrate the ability to give an effective lecture or presentation
   3.5. Assess and reflect on a teaching encounter
   3.6. Provide and receive effective feedback
   3.7. Describe the principles of ethics with respect to teaching
4. Contribute to the development, dissemination, and translation of new knowledge and practices
   4.1. Describe the principles of research and scholarly inquiry including:
      4.1.1. Research principles
         4.1.1.1. Test-performance characteristics: principles of sensitivity, specificity, predictive value, and randomized controlled trial analyses
         4.1.1.2. Experimental design
         4.1.1.3. Data analysis and biostatistics
         4.1.1.4. Epidemiology

4.1.1.5. Informed consent
4.1.1.6. Adverse event reporting
4.2. Research ethics
4.3. Pose a scholarly question relevant to the specialty of clinical immunology and allergy
4.4. Conduct a systematic search for evidence
4.4.1. Develop the skills to store and retrieve relevant literature
4.5. Select and apply appropriate methods to address the question
4.6. Disseminate the findings of a study

Professional

Definition: As *professionals*, clinical immunologists and allergists are committed to the health and wellbeing of individuals and society through ethical practice, profession-led regulation, and high personal standards of behavior.

Key and enabling competencies: clinical immunologists and Allergists can…

1. Demonstrate a commitment to their patients, profession, and society through ethical practice
   1.1. Exhibit appropriate professional behaviors in practice, including honesty, integrity, commitment, compassion, respect, altruism, punctuality, reliability, conscientiousness, and self-awareness
   1.2. Demonstrate a commitment to delivering the highest quality care and maintenance of competence
   1.3. Demonstrate a working knowledge of medical ethics, and recognize and appropriately respond to ethical issues encountered in practice
   1.4. Identify, declare, and manage conflicts of interest
   1.5. Recognize the principles and limits of patient confidentiality as defined by professional practice standards and the law
   1.6. Maintain appropriate relations with patients
2. Demonstrate a commitment to their patients, profession, and society through participation in profession-led regulation
   2.1. Demonstrate knowledge and an understanding of the professional, legal, and ethical codes of practice
   2.2. Fulfill the regulatory and legal obligations required of current practice
   2.3. Demonstrate accountability to professional regulatory bodies
   2.4. Recognize and respond to others' unprofessional behaviors in practice
   2.5. Participate in peer review
3. Demonstrate a commitment to physician health and sustainable practice
   3.1. Balance personal and professional priorities to ensure personal health and a sustainable practice
   3.2. Strive to heighten personal and professional awareness and insight
   3.3. Recognize other professionals in need and respond appropriately [1]

2.5. Continuum of learning

The following table illustrates the different milestones that should be acquired by the trainee at every level of training and those expected to be accomplished by the end of training that will qualify the trainee to work as a consultant.

[1]Copyright © 2012 The Royal College of Physicians and Surgeons of Canada. Referenced and produced with permission. It was modified for the SaudiMed Framework and local program needs and requirements.

F1	F2	Consultant
Obtain fundamental knowledge in basic immunology, immunodeficiencies, and allergy	Apply knowledge to understand complex pathophysiology of various immunological conditions	Acquire up-to-date advanced knowledge related to core immunology and explain it to junior fellows and residents
Develop the essential clinical skills in physical examination, related to the field, as well as procedures such as skin prick testing and food challenge	Analyze and interpret findings from examination and allergy testing and obtain the ability to order immunotherapy	Obtain the ability to judge controversial issues related to investigations and management of patient with immunological problems
Understand the basic investigations and therapeutics of patients with suspected immunodeficiency	Acquire the ability to utilize investigations and fine tune management	Understand the use of advanced, unconventional investigations and therapeutics
Obtain knowledge on complications of allergic and immunologic disorders	Can anticipate, prevent, and treat complications	Contribute to improved management of immunological disease through scientific research

2.6. Core conditions

These are the main diseases/conditions the fellow is expected to face during his training in the specialty and afterwards.

Disease or condition	Approximate frequency
Asthma	10%
Allergic rhinitis	20%
Atopic dermatitis (eczema)	5–15%
Urticaria	Variable
Food allergy	8%
Primary immunodeficiency	1:2000

Expected level of competency of core specialty level problems

Competency level	F1	F2
Take focused history		
Perform detailed physical examination		
Formulate orderly differential diagnosis		
Order relevant and appropriate investigations		
Analyze and interpret relevant data		
Request genetic testing and interpret results		
Recognize the need for advanced cell phenotyping by flow cytometry		
Basic management of allergic and immunodeficiency diseases and their complications		
Counsel patients and their families regarding environmental controls, disease complications, and genetics		
Understand the essentials of epidemiologic and basic science research		
Teach students, residents, and fellow colleagues as well as other healthcare professionals		
Master skill of self-learning and professional development		

3. Learning Opportunities

3.1. General principles

The teaching and learning methods within this document cater for the range of adult learning styles, situations, and processes likely to be experienced within most professional environments.

A range of core teaching and learning strategies is presented in the following list.

1. Lectures
2. Tutorials and seminars
3. Demonstrations/observation
4. Task performance/practice/observation
5. Assignments/projects
6. Research, including audits
7. Conferences/workshops

8. Journal clubs
9. Clinics/tailored clinical experiences
10. Ward rounds
11. Grand rounds
12. Committee/multidisciplinary team meetings
13. Mentoring
14. Coaching
15. Simulations – computer/virtual reality
16. Interactive multimedia, including audio/video conferencing
17. Role play exercises
18. Critical incident analysis
19. Case studies
20. Online mediated/tutor monitored discussion groups

3.2. Universal topics

1. **Safe drug prescribing:** At the end of the learning unit, you should be able to
   a) Recognize importance of safe drug prescribing in healthcare
   b) Describe the various adverse drug reactions with examples of commonly prescribed drugs that can cause such reactions
   c) Apply principles of drug-drug interactions, drug-disease interactions, and drug-food interactions into common situations
   d) Apply principles of prescribing drugs in special situations such as renal failure and liver failure
   e) Apply principles of prescribing drugs in elderly, pediatric, pregnant, and lactating patients
   f) Promote evidence-based cost-effective prescribing
   g) Discuss ethical and legal framework governing safe-drug prescribing in Saudi Arabia

2. **Hospital acquired infections (HAI):** At the end of the learning unit, you should be able to
   a) Discuss the epidemiology of HAI with special reference to HAI in Saudi Arabia
   b) Recognize HAI as one of the major emerging threats in healthcare
   c) Identify the common sources and set-ups of HAI
   d) Describe the risk factors of common HAIs such as ventilator associated pneumonia and vancomycin resistant enterococcus.
   e) Identify the role of healthcare workers in the prevention of HAI.
   f) Determine appropriate pharmacological (e.g., selected antibiotic) and non-pharmacological (e.g., removal of indwelling catheter) measures in the treatment of HAI
   g) Propose a plan to prevent HAI in the workplace.

3. **Blood transfusion:** At the end of the learning unit, you should be able to
   a) Review the different components of blood products available for transfusion
   b) Recognize the indications and contraindications of blood product transfusion
   c) Discuss the benefits, risks, and alternative to transfusion
   d) Undertake consent for specific blood product transfusion
   e) Perform steps necessary for safe transfusion
   f) Develop understanding of special precautions and procedures necessary during massive transfusions
   g) Recognize transfusion associated reactions and provide immediate management

4. **Management of fluid in hospitalized patients:** At the end of the learning unit, you should be able to
   a) Review physiological basis of water balance in the body
   b) Assess a patient for his/her hydration status
   c) Recognize a patient with over and under hydration
   d) Order fluid therapy (oral as well as intravenous) for a hospitalized patient
   e) Monitor fluid status and response to therapy through history, physical examination, and selected laboratory investigations

5. **Occupation hazards of healthcare workers (HCW):** At the end of the learning unit, you should be able to
   a) Recognize common sources and risk factors of occupational hazards among the HCW
   b) Describe common occupational hazards in the workplace
   c) Develop familiarity with legal and regulatory frameworks governing occupational hazards among the HCW
   d) Develop a proactive attitude to promote workplace safety
   e) Protect yourself and colleagues against potential occupational hazards in the workplace

6. **Patient advocacy**: At the end of the learning unit, you should be able to
   a) Define patient advocacy
   b) Recognize patient advocacy as a core value governing medical practice
   c) Describe the role of patient advocates in the care of the patients
   d) Develop a positive attitude towards patient advocacy
   e) Be a patient advocate in conflicting situations
   f) Be familiar with local and national patient advocacy groups

7. **Ethical issues: treatment refusal; patient autonomy:** At the end of the learning unit, you should be able to
   a) Predict situations in which a patient or family is likely to decline prescribed treatment
   b) Describe the concept of “rational adult” in the context of patient autonomy and treatment refusal
   c) Analyze key ethical, moral, and regulatory dilemmas in treatment refusal
   d) Recognize the importance of patient autonomy in the decision-making process
   e) Counsel patients and families declining medical treatment in the light of best interest of patients

8. **Role of doctors in death and dying:** At the end of the learning unit, you should be able to:
   a) Recognize the important role a doctor can play during a dying process
   b) Provide emotional as well as physical care to a dying patient and family
   c) Provide appropriate pain management in a dying patient
   d) Identify suitable patients and refer to patient to palliative care services

3.3. Core specialty topics

Grand rounds/staff or guest lectures	1. Increase fellow's medical knowledge and skills 2. Understand and apply current practice guidelines 3. Describe the latest advances in the field and research. 4. Identify and explain areas of controversy in the field
Case presentation	1. Present a focused history and physical examination 2. Formulate list of all problems identified 3. Develop a proper and informative differential diagnosis 4. Formulate and discuss a treatment plan 5. Improve case presentation skills by proper feedback on presentation
Journal club/evidence-based medicine	1. Critically appraise the literature 2. Promote continuing professional development 3. Understand the basis of hypothesis testing 4. Keep up with the literature 5. Ensure that professional practice is evidence based 6. Learn and practice critical appraisal skills 7. Provide an enjoyable educational and social occasion 8. Understand sources of bias 9. Understand how results of study can be used in clinical practice 10. Understand the basis of diagnostic testing (prevalence, sensitivity, specificity, positive and negative predictive values, likelihood ratios) 11. Develop the skills necessary to critically review published data 12. Learn to interpret and appropriate apply published data 13. Develop the skills necessary for life-long learning
Basic immunology presentation	1. Understand the anatomy and cellular elements of the immune system a) Lymphoid organs – anatomy and functions. 2. Cells of relevance to the immune response, 3. Understand the immune mechanisms a) Innate and acquired immunity b) The major histocompatibility complexities c) Antigens – processing and presentation d) Allergens – structure, epitopes e) Immunogenetics f) T-cell-mediated immunity g) B-cell-mediated immunity h) Other immune mechanisms 4. Understand the immunomodulation in the immune response a) Cytokines, chemokines, adhesion molecules and growth factors b) Inflammation and its modulation 5. Understand the mucosal immunity a) Non-immunologic – enzymes, acids, glycocalyx, normal flora, etc. b) Immunologic – mucosa-associated lymphoid tissue, antigen processing, antibody and cellular production, cell trafficking and homing

	6. Understand the transplantation immunology a) Mechanisms of allograft rejection b) GVHR 7. Understand the tumor immunology a) Antigens of tumor cells – unique tumor-specific antigens and tumor-associated antigens b) Oncogenes, translocations, and tumor suppressor genes c) Mechanisms of immune surveillance 8. Understand the immunoregulatory mechanisms a) Tolerance mechanisms b) Idiotypic networks c) Apoptosis

3.4. Trainee-selected topics

Trainees develop a list of topics on their own. All the topics need to be approved by the local education committee.

Examples of trainee topics

1. Communication skills
2. Decision making
3. Evidence-based medicine
4. Clinical teaching and learning strategy
5. Breaking bad news
6. Medical ethics and malpractices and patient safety
7. Publication skills
8. Objective Structured Clinical Exam (OSCE) preparation
9. Medication safety practices
10. Child safety and environmental hazards
11. Stress coping and management
12. Critical appraisal and how to make journal club
13. How to write a research proposal

3.5. Education activities

Example of weekly schedules of formal educational activities:

Time	Sunday	Monday	Tuesday	Wednesday	Thursday
7:30–8:15 a.m.	Morning report	Grand rounds	Case conference	Morning report	Morning report
12:30–13:30 p.m.	Basic immunology	Journal club	Lecture presentation (case, topic, or invited speaker)		All staff Patient round

4. Assessment of Trainees

4.1. Purpose of assessment

1. Support learning
2. Develop professional growth
3. Monitor progression
4. Competency judgment and certification
5. Evaluate the quality of the training program

4.2. General principles

1. Judgment should be based on holistic profiling of a trainee rather than individual traits or instruments
2. Assessment should be continuous in nature
3. Trainee and faculty must meet to review portfolio and logbook once every two months and at the end of a given rotation
4. Assessment should be strongly linked to the curriculum and the content
5. Follow the SCFHS policy for continuous assessment and end of year and final exams

4.3. Evaluation and promotion

Assessment of learners are conducted in accordance with the SCFHS training and examination rules and regulations. Assessment is divided into two parts:

- Formative assessment (continuous assessment process during training period)
- Summative assessment (end of the program)

The learners undergo formative and summative assessment. The training centers execute formative assessment, while the SCFHS conducts summative assessment. The learners are required to sit for the written promotion examination to advance to the second year. The learner is required to pass all continuous assessment tools stated by the specialty's scientific committee to fulfill training requirements of the given calendar year. Refer to the executive policy on continuous assessment and annual promotion for further detail (see https://www.scfhs.org.sa/en/examinations/Regulations/Assessment%20Conduct%20Regulations.pdf).

The summative examination includes both a written assessment for the knowledge and clinical OSCE for clinical skills.

4.3.1. Formative/continuous assessment

Formative/continuous assessment enables those involved in the training process (i.e., preceptors) to provide objective feedback. It also involves evaluating interactive training activities, such as case studies, seminars, and research project. A report must be submitted to the Regional Training Supervisory Committee of the Specialty for review and follow-up of learners' progress. The formative assessment shows the learners' performance in relation to knowledge, attitude and skills during training period. The learners must pass satisfactory in all the assessment.

Training level	Domain	Assessment tool
F1	Knowledge	End of year written exam Academic activities
	Skills	Logbook Research
	Attitude	ITER (In-Training Evaluation Report)
F2	Knowledge	Academic activity
	Skills	Logbook Research/community volunteering
	Attitude	ITER

4.3.2. Summative assessment

The end-of-program examinations are comprehensive. The learner will be awarded their fellowship certificate on successful completion of these examinations.

- The final written examination assesses learners' theoretical knowledge and critical thinking skills in relation to all of the topics and clinical experience covered during the program. The examination format and scoring system is based on the Saudi Commission Examination Rules and Regulations, available from the SCFHS website (www.scfhs.org.sa).
- The final examination is an OSCE that assesses learners' clinical skills, including data gathering, patient management, communication, and counseling. This examination will include a specific number of stations designed to achieve the training objectives. The examination format is based on the Saudi Commission Examination Rules and Regulations, available from the SCFHS website (www.scfhs.org.sa).

	Questions	Time	Mark	Pass
Final written exam	120 multiple-choice +/- short notes	2.5 hours	120	70%

Final objective structured clinical exam*	**Clinical (structured oral cases)** 10 cases (history taking, case scenario, short cases, slides, data interpretation, real/simulated patients etc.)	Mark	Pass
		100	70/100

*Passing the final written exam is a pre-requisite for entering the clinical exam.

Examination Blue: Questions are based on an educational or instructional objective according to the blueprint. This is just an example that does not reflect the real exam blueprint.

No.	Subject	%	Domain				
			Epidemiology, prevention, and health promotion	Pathogenesis and basic science	Diagnosis, investigation, and data interpretation	Management	Other
1	Anaphylaxis	5					
2	Asthma	20					
3	Rhinitis, sinusitis, conjunctivitis	15					
4	Food allergy	10					
5	Urticaria and angioedema	5					
6	Atopic skin disorders	10					
7	Drug and vaccine allergy	10					
8	Insect allergy	5					
9	Primary immune-deficiency disorders	15					
10	Immune systemic disorders (Mastocytosis, Hypersensitivity pneumonitis, etc.)	5					
	Total	**100**	**~10–15%**	**~20–25%**	**~20–25%**	**~30–40%**	**~5–10%**

4.4. Log book

Table 1: Academic activities attended outside the section

Name: Fellowship year:

Date	Activity type Specify seminar, journal club, presentation, etc.	Particulars

Table 2: Academic presentations made by the fellow

Name: Fellowship year:

Date	Topic	Presentation type Specify seminar, journal club, presentation, etc.

Table 3: Diagnostic and therapeutic procedures performed

Name: Fellowship year:

The procedures include:
the skin prick test, intradermal skin test, food challenge test, immunotherapy injection, Drug desensitization, and other procedures during rotations

Date	Name	ID no.	Procedure	Category O, A, PA, PI*

*O = observed, A = assisted, PA = performed with supervision, = P performed independently

4.5. Mini-Clinical Evaluation Exercise (mini-CEX)

Descriptors of competencies demonstrated during the mini-CEX

1- Medical interviewing skills: facilitates patients' account of events; effectively uses questions/directions to obtain accurate, adequate needed information; and responds appropriately to affective, non-verbal cues

2- Physical examination skills: follows efficient, logical sequence; balances screening/diagnostic steps for problems; informs patients; sensitive to patients' comfort; and modest

3- Professionalism: shows respect, compassion, empathy; establishes trust; and attends to patients' needs of comfort, modesty, confidentiality, information

4- Clinical judgment: selectively orders/performs appropriate diagnostic studies, and considers risks and benefits

5- Counseling skills: explains the rationale for a test/treatment, obtains patients' consent, and educates/counsels regarding proper management

6- Organization/efficiency: prioritizes, and is timely and succinct

7- Overall clinical competence: demonstrates good judgment, synthesis, caring, effectiveness, and efficiency

4.5.1. mini-CEX (instructions for fellows)

The mini-CEX assesses clinical skills, attitudes, and behaviors in clinical care settings.

4.5.2. How the mini-CEX works

The mini-CEX provides a 15-minute snapshot of how fellows interact with patients in clinical care settings.

4.5.3. Preparing for the mini-CEX

Each mini-CEX should represent a different clinical problem, and fellows should have drawn samples from a wide range of problem groups by the end of the fellowship training years 1 and 2.

4.5.4. Conducting the mini-CEX

The mini-CEX may be overseen by the clinical mentor, trainer, or program director, depending on center arrangements.
The mini-CEX may be observed by a staff grade doctor, nurse practitioner, clinical nurse specialist, an experienced specialty registrar, or consultant. The observer should not be a peer or a fellow general practitioner trainee or specialty trainee at a similar training stage.

4.5.5. Using mini-CEX feedback

The observer will provide immediate feedback, which will be rated and recorded in the fellows' training profiles. Fellows will develop a learning plan based on the strengths and developmental needs observed. This plan must be recorded in the learning log within the training profile.

4.5.6. When taking the mini-CEX

Fellows are expected to undertake four to six observed encounters in each training year.

4.5.7. Formative MiniCEX Scoring Form

(The provided form is for demonstration purposes, the trainees and trainers are recommended to use the officially announced forms by SCFHS, electronic forms should be applied whenever feasible.)

Name of candidate: Date of assessment: / /

Stage of training: ☐ F1 ☐ F2 Name of assessor:

Setting: ☐ ER ☐ OPD ☐ Inpatient

Other:

Patient's problem/s:

Patient's age:

Patient's sex: ☐ Male ☐ Female

Case complexity: ☐ Low ☐ Medium ☐ High

Please rate the candidate against what you would expect of a candidate in that stage of training:				
	Unsatisfactory	**Borderline**	**Satisfactory**	**Excellent**
Overall clinical competence	☐1	☐2	☐3	☐4
Clinical management	☐1	☐2	☐3	☐4
History taking	☐1	☐2	☐3	☐4
Communication skills	☐1	☐2	☐3	☐4

Physical examination: Please rate the candidate against what you would expect of a candidate in that stage of training: **Tick if no physical examination** ☐ **N/A**				
	Unsatisfactory	**Borderline**	**Satisfactory**	**Excellent**
Overall competence in physical examination	☐ 1	☐ 2	☐3	☐ 4
Appropriateness of physical examination in the context of the consultation	☐ 1	☐ 2	☐ 3	☐ 4
Appropriate examination technique	☐ 1	☐ 2	☐ 3	☐ 4
Correct interpretation of findings	☐ 1	☐ 2	☐ 3	☐ 4
Professional approach to patient and family	☐ 1	☐ 2	☐ 3	☐ 4
Accurate recording of physical examination findings	☐ 1	☐ 2	☐ 3	☐ 4

Assessor's Signature: Date: / /

Candidate's Signature: Date: / /

Time taken for observation: minutes
Time taken for feedback: minutes

How to rate a candidate

Unsatisfactory: The candidate has not managed this case presentation appropriately at the level of a safe practitioner

Borderline: The candidate is not performing at a level expected at this stage of training

Satisfactory: The candidate is performing at a level expected at this stage of training

Excellent: The candidate is performing at a level above what is expected at this stage of training

Assessor's satisfaction with using the miniCEX: ☐ *LOW* ☐ 2 ☐ 3 ☐ 4 ☐ *HIGH*

Candidate's satisfaction with using the miniCEX: ☐ *LOW* ☐ 2 ☐ 3 ☐ 4 ☐ *HIGH*

Definitions of case complexity

Low: This may include presentations where there is a single problem, requiring limited history, physical examination, and straight-forward management.

Medium: This may include presentations where there are one or more problems, requiring a detailed history and examination of multiple systems, the diagnosis is not straight forward, and patient review following a period of management will be required.

High: This may include difficult problems where the diagnosis is elusive and highly complex, requiring consideration of several possible differential diagnoses, and deciding on the most appropriate investigations and the order in which they should be performed.

4.6. Definition of terms: specific areas of assessment

Overall clinical competence Characteristics of a "satisfactory" candidate in this area may include the following: overall, the candidate demonstrates a systematic approach; is consistently competent across the marking categories; and has made clear efforts to ensure patient comfort and safety and to reduce risks where appropriate in the clinical situation.	**History taking** Characteristics of a "satisfactory" candidate in this area may include the following: the candidate effectively uses appropriate questions to obtain an accurate, adequate history with necessary information, and responds appropriately to verbal and non-verbal cues.
Clinical management Characteristics of a "satisfactory" candidate in this area may include the following: the candidate makes an appropriate diagnosis, formulates a suitable management plan, selectively orders or performs appropriate diagnostic studies, and considers the risks and benefits to the patient. The candidate has a clear and demonstrated understanding of the patients' community needs, the socioeconomic context and the mortality and morbidity patterns of that community; and provides high quality care to the patient, family, and broader community that is delivered locally (as far as possible).	**Communication skills** Characteristics of a "satisfactory" candidate in this area may include the following: the candidate explores the patient's problem using plain English; is open, honest, and empathetic; negotiates a suitable management plan/therapy with the patient; shows respect, compassion, and empathy; establishes trust; attends to the patient's comfort needs; shows awareness of relevant legal frameworks; and is aware of his/her own limitations. Where relevant, the candidate demonstrates an understanding of the differing cultural beliefs, values, and priorities of Aboriginal and Torres Strait Islander people, as well as other cultural groupings regarding their health and healthcare provision; and the candidate communicates effectively respecting these cultural differences.

4.7. 360-degree assessment

Evaluations will be sent to healthcare professionals who interact with the fellow. They will include, nurse practitioners, nurses, respiratory therapists, coordinators, clerks and other supportive services. These evaluations will focus on the fellow's professionalism.

COMPETENCE IN INTERPERSONAL/COMMUNICATION SKILLS

Evaluator name:

Fellow name: _____

Fellow must demonstrate interpersonal and communication skills that result in effective information exchange and teaming with patients, their families, and professional associates.

Score the following boxes as shown below to indicate how often you observed the behavior

❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Not applicable	Rarely demonstrates (< 25% of the time)	Sometimes demonstrates (25–50% of the time)	Demonstrates in most cases (50–75% of the time)	Demonstrates in majority of cases (> 75% of time)

Competency: Communicate effectively to create and sustain a therapeutic relationship with patients and families					
Knowledge/skills/attitudes benchmarks:					
Obtains historical information from appropriate individual (patient, caregiver, etc.)	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Makes appropriate introductions and explains personnel roles	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Respects privacy of patient/family by using various areas in facility for conversations, exams, etc.	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Shows evidence of being able to sustain a continuing relationship with the patient	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Uses appropriate language at the proper developmental/educational level for the patient and/or caregivers/family members	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Uses a variety of techniques to elicit information from the patient	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Uses effective listening skills to elicit information	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Makes the patient comfortable enough to extract all necessary information when engaging in probing conversation	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Ensures the patient understands instructions	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Provides instructions to patients in a variety of ways	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4

Comments: Please provide comments regarding any scores of 1 or 4

Competency: Work effectively with others as a member or leader of a healthcare team or other professional groups					
Knowledge/skills/attitudes benchmarks:					
Takes time to learn the names of other employees	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Shows respect to co-workers and provides information when needed	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Facilitates team communication when in role of team leader	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Assumes the role of consultant where appropriate	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Provides constructive verbal and written feedback to other members of the healthcare team	❑ NA	❑ 1	❑ 2	❑ 3	❑ 4
Medical records are thorough, readable, and done on time	❑ NA	❑	❑	❑	❑

Comments: Please provide comments regarding any scores of 1 or 4

	N/A	Clear Fail (1)	Borderline (2)	Clear Pass (3)	Exceed Expectations (4)
A. MEDICAL EXPERT: History & Physical Examination: 1. Comprehensive, accurate & concise with all relevant details	○	○	○	○	○
Diagnostic Tests: 2. Used in a cost-effective manner & understands limitations & predictive value.	○	○	○	○	○
Clinical Decision: 3. Able to formulate appropriate differential diagnosis.	○	○	○	○	○
4. Able to analyze, integrate, and formulate effective management strategies.	○	○	○	○	○
Medical Knowledge: 5. Broad Clinical & Basic knowledge of a wide variet of medical problems and develops a plan of secondary prevention.	○	○	○	○	○
Emergency Management: 6. Able to identify and respond appropriately to urgent cases	○	○	○	○	○
Evidence-based Practice/Critical Appraisal Skills: 7. Aware of the role of evidence in clinical decision-making.	○	○	○	○	○
8. Able to apply relevant information in problem-solving.	○	○	○	○	○
9. Demonstrates knowledge of medications used, mechanisms of action, clinically relevant pharmacokinetics, indications, contraindications, and adverse effects.	○	○	○	○	○
Procedural Skills: 10.. Perform diagnostic & therapeutic procedures, undestands indications, limitations & complications.	○	○	○	○	○
B. COMMUNICATOR 11. Communicates effectively with patients, their families, and HCPs.	○	○	○	○	○
12. Able to maintain clear, accurate & appropriate records.	○	○	○	○	○
13. Written orders and progress notes are well organized & legible.	○	○	○	○	○
14. Discharge summaries are concise & completed promptly.	○	○	○	○	○
C. COLLABORATOR: 15. Works effectively in a team environment with attending, juniors & nursing staff.	○	○	○	○	○
D. MANAGER : 16. Serves in administration and leadership roles as appropriate.	○	○	○	○	○
17. Appropriate & efficient use of health care resources.	○	○	○	○	○

	N/A	Clear Fail (1)	Borderline (2)	Clear Pass (3)	Exceed Expectations (4)
E. SCHOLAR : 18. Attends and contributes to rounds, seminars, and other learning events.	○	○	○	○	○
19. Accepts and acts on constructive feedback.	○	○	○	○	○
20. Contributes to the education of patients, junior residents, house staff, and students.	○	○	○	○	○
21. Contributes in scientific research.	○	○	○	○	○
F. HEALTH ADVOCATE : 22. Able to identify the psychosocial, economic, environmental & biological factors which influence the health of patients and society.	○	○	○	○	○
23. Offers advocacy on behalf of patients at practice and general population levels.	○	○	○	○	○
G. PROFESSIONAL : 24. Delivers the highest quality of care with integrity & compassion. Recognizes limitations and seeks advice and consultations when necessary.	○	○	○	○	○
25. Reflects the highest standards of excellence in clinical care and ethical conduct.	○	○	○	○	○

Comments (areas of strengths/areas for improvement)

The following will be displayed on forms where feedback is enabled...
(for the evaluator to answer...)

*Did you have an opportunity to meet with this resident to discuss their performance?
○ Yes
○ No

(for the evaluee to answer...)

*Are you in agreement with this assessment?
○ Yes
○ No

Please enter any comments you have (if any) on this evaluation.