الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

ADULT INFECTIOUS DISEASES

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بسم الله الرحمن الرحيم

الهيئة السعودية للتخصصات الصحية
Saudi Commission for Health Specialties

SAUDI FELLOWSHIP

ADULT INFECTIOUS DISEASES CURRICULUM

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TABLE OF CONTENTS

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INTRODUCTION

Purpose

This proposal is submitted to seek the Scientific Committees' approval to reduce the duration of the Adult Infectious Diseases (ID) Fellowship training program from the existing three years to two years.

Background

The Adult ID Fellowship program was established in 2005, offered in two locations in Riyadh. At the time, only nine mentors were available, but over the years, the number of qualified ID Specialists has grown. Currently, there are eight accredited centers, with another one pending accreditation. The faculty roster has increased to 38 experts in these centers. In 2014, 27 Fellows were in training; 20 Fellows have been accepted for 2015.

The Kingdom of Saudi Arabia (KSA) is a large country with vast geographical variations. Despite major efforts, cases of treatable tropical and endemic diseases remain considerable in number. With the expansions in healthcare service over the past four decades, hundreds of healthcare centers have been opened at all levels, from primary to tertiary and even fourth-level care.

Healthcare-associated infection is one of the leading causes of mortality and morbidity worldwide; most cases are preventable and treatable in the presence of Specialist (ID) physicians. KSA, with its Holy sites and strong economy, hosts millions of people from all over the world, thus facing the risk of importing communicable and contagious infections. Over the past few years, we have witnessed several outbreaks of emerging infections that require sub-specialists. An example is HIV, which is a pandemic in KSA as well. HIV management needs highly trained physicians. With the advances in the healthcare system in KSA, the country has seen an influx of immunocompromised (oncology, organ transplants) patients.

RATIONALE FOR THE CHANGE IN TRAINING DURATION

As mentioned, when the program started in 2005, the mentors were few, and the experience in supervision and monitoring was limited. Over the last 10 years, we have built the knowledge and skills to apply strict monitoring criteria for ensuring the high quality of training. Our module of training is compatible with similar ID fellowship programs in the US and Canada, which have more than 40 years of history. The ID fellowship training programs in Canada and US span two years. We are confident that we can provide the trainees with the knowledge and skills in ID to function at Consultant level during the two-year training period. Our mentors have been trained in a well-structured ID fellowship program, and they have the knowledge and skills to teach, supervise, and guide the trainees.

THE KEY CHANGES - WHAT ARE THEY?

SUBJECT	THREE YEARS	TWO YEARS
General Infectious Diseases	14 months (60 weeks)	12 months (52 weeks)
Microbiology	6 months (24 weeks)	3 months (12 weeks)
Immunocompromised Hosts	3 months (12 weeks)	3 months (12 weeks)
Pediatrics	2 months (8 weeks)	1 month (4 weeks)
Infection Control	3 months (12 weeks)	1.5 months (6 weeks)
Research	3 months (12 weeks)	1.5 months (6 weeks)
Elective	2 months (8 weeks)	
Vacation	3 months (12 weeks)	2 months (8 weeks)
TOTAL	**36 months (148 weeks)**	**24 months (100 weeks)**

Based on the table, the two programs have the following differences:

a) General ID is changed from 14 to 12 months. With the expansion in hospital bed capacity and the number of mentors, 12 months will provide adequate exposure to different cases in general ID.
b) No change in the immunocompromised rotation.
c) Pediatric rotation is changed from two to one month. Feedback from graduates showed that they do not gain much knowledge or skills beyond one month. Canadian and American fellowship programs both have one-month rotation in Pediatrics.
d) Microbiology is changed from six to three months. With the advances in technology, most laboratory tests are automated. Further, the majority of the hospitals in KSA have a microbiologist. The Scientific Committee felt that the trainees will acquire the knowledge and skills needed for ID Physician in medical microbiology in three months. Both Canadian and American programs allocate three months of rotation in Microbiology as well.
e) Research is changed from 12 to 6 weeks. The new program mandates each fellow to have a mentor and a research proposal to be drafted in the first six months and to be submitted not later than twelfth month in training.
f) Elective full-time rotation is changed from eight weeks to be integrated in the research duration as the mentors expect the trainees to work through their project during other rotations.
g) Infection Control is changed from 12 to 6 weeks. ID Physicians in Infection Control take the roles of planning and supervision. Infection Control (IC) Practitioners are the ones doing field work, according to the expansion in IC training program. This reduction is compatible with Canadian and American programs.

COMPARISON BETWEEN EXISTING AND PROPOSED CURRICULA

Item	Three-year program	Two-year program
Admission Requirements	1) Possesses a Saudi Commission Certificate in Internal Medicine or equivalent (approved by SCHS) or have at least successfully completed the written component of the Saudi Specialty Certificate in Internal Medicine	**No change**
	2) Licensed to practice medicine in Saudi Arabia	
	3) Provide written permission from the sponsoring institution, allowing participation in full-time training for the entire three-year program	
	4) Sign an undertaking to abide by the rules and regulations of the Training Program and the Saudi Commission	
	5) Successfully pass the interview	
	6) Provide three letters of recommendation from consultants with whom the candidate has recently worked	
Goal of the program / General Objectives	To provide training and supervised experience at a sufficient level for ID fellows to acquire the competency of a specialist in the field of infectious diseases. The Program aims to produce physicians competent to function as consultants in ID. During the course of the training, candidates must acquire clinical competence in the diagnosis and management of common bacterial, viral, fungal, and parasitic diseases. Candidates will acquire sound knowledge in the basic sciences of microbiology, immunology, pathology, and pathophysiology of infectious diseases. Competent knowledge in antimicrobial therapy is also targeted, including classification, mechanism of action, and mechanism of resistance, pharmacokinetics, and toxicity of antimicrobial agents. Candidates will acquire laboratory skills and be able to interpret data related to the diagnosis of infections. Adequate knowledge and skills in general epidemiology, hospital epidemiology, hospital infection control,	**No change**

Item	Three-year program	Two-year program
	travel medicine, research, and quantitative methods for infectious diseases are goals during the later stages of training. Candidates must become familiar with the ethical considerations in the practice and research of infectious diseases and are expected to acquire the communication skills necessary to function effectively with other physicians, healthcare workers, and patients and their relatives.	
Broad outcomes	To produce competent ID physicians to serve the communities in KSA and enable them to take the next step in their career as expert clinical practitioners or enter other venues, including academic and investigative programs.	**No change**
Rotation duration	• 14 months General ID	• 12 months General ID
	• 6 months Microbiology	• 3 months Microbiology
	• 3 months Research	• 1.5 months (6 weeks) combined Research and Elective
	• 3 months Elective	• 6 weeks Infection Control
	• 3 months Infection Control	• 6 weeks Pediatric ID
	• 3 months Pediatric ID	• 3 months Immunocompromised hosts and HIV
	• 3 months	
	• Immunocompromised hosts and HIV	
Assessment and evaluation	The evaluation of the candidates will be done though the following:	**No change**
	• End-of-rotation evaluation	
	• In-training End-of-year Examinations	
	• End-of-training examination	

Item	Three-year program	Two-year program
	Per the training by-laws of the Saudi Commission for Health Specialties, continuous supervision and evaluation of Fellows should be done by the consultant in charge; a written evaluation using the designated form should be accomplished by the end of each rotation. Decision on the progress of trainees to the next level will be based on the evaluations. Trainees must take the written final examination.	
Monitoring	The local and Scientific ID fellowship committees will be responsible for the continuous monitoring of the accredited training centers.	**No change**

Benchmarking

The proposed two-year training program for ID fellowship will be in alignment with international benchmarked training programs.

In the United States, the ID fellowship training program is a **two-year** training program with **an optional** third year of advanced research training. The first year of training is focused on clinical work, with time set aside to choose a research mentor and create a research plan. The second year is largely spent working on the research project, with clinical responsibilities still possible.

In Canada, the subspecialty training program in ID is accredited by the Royal College of Physicians and Surgeons of Canada as a **two-year** training period. Candidates may enter the program after completing three core years of training in internal medicine. For trainees who have an interest in combining the ID training program with medical microbiology, a three-year combined fellowship can be considered.

Implications

With the current three-year training program, repetitive training was intentionally designed. However, the expansion in number of hospital beds has provided more exposure, and thus, an increase in the number of mentors it no longer necessary. Advances in technology (microbiology) and availability of supportive staff (infection control practitioners) likewise support the achievement of educational goals with the proposed changes. The proposed two-year program is compatible with the US and Canadian curricula, and will provide the required knowledge and skills for trainees to graduate to consultant level. KSA is witnessing increasing demand for ID Physicians. A reduction in the duration of training (without compromising quality) will provide more qualified and skilled ID physicians to meet the demand.

Despite the new changes, the Department is not anticipating the need for additional resources. Adequate training and supervision will be delivered by the current number of faculty members.

COMPETENCIES FOR THE FELLOWSHIP PROGRAM

The learning objectives of these seven CanMEDS physician competencies and topics for mastery are incorporated in the different academic activities.

Medical Expert

Definition

As Medical Experts, physicians integrate all of the CanMEDS Roles, applying medical knowledge, clinical skills, and professional attitudes in the provision of patient-centered care. The Medical Expert is the central physician Role in the CanMEDS framework.

Description

Physicians possess a defined body of knowledge, clinical skills, procedural skills, and professional attitudes, crucial to effective patient-centered care. They apply these competencies to collect and interpret information, make appropriate clinical decisions, and carry out diagnostic and therapeutic interventions. They do so within the boundaries of their discipline, personal expertise, the healthcare setting, and patients' preferences and context. Their care is characterized by up-to-date, ethical, and resource-efficient clinical practice as well as with effective communication with patients, other health care providers, and the community. The Role of Medical Expert is central to the function of physicians and draws on the competencies included in the Roles of Communicator, Collaborator, Manager, Health Advocate, Scholar, and Professional.

Elements

- Integration and application of all CanMEDS Roles for patient care
- Core medical knowledge
- Patient problem identification
- Diagnostic reasoning
- Clinical judgment
- Clinical decision making
- Application of appropriate treatments
- Procedural skill proficiency
- Humane care
- Application of ethical principles for patient care
- Function as a consultant
- Recognition of limits of expertise
- Maintenance of competence
- Principles of patient safety and prevention of adverse events

Key Competencies: Physicians are able to:

1. Function effectively as consultants, integrating all of the CanMEDS Roles to provide optimal, ethical, and patient-centered medical care
2. Establish and maintain clinical knowledge, skills, and attitudes appropriate to their practice
3. Perform a complete and appropriate assessment of patients
4. Use preventive and therapeutic interventions effectively

5. Demonstrate proficient and appropriate use of both diagnostic and therapeutic procedural skills
6. Seek appropriate counsel from other health professionals, in recognition of the limits of their expertise

Enabling Competencies: Physicians are able to:

1.	**Function effectively as consultants, integrating all of the CanMEDS Roles to provide optimal, ethical, and patient-centered medical care**
1.1.	Effectively perform a 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 effective use of all CanMEDS competencies relevant to their practice
1.3.	Identify and appropriately respond to relevant ethical issues arising in patient care
1.4.	Effectively and appropriately 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 maintain clinical knowledge, skills, and attitudes appropriate to their practice**
2.1.	Apply knowledge of the clinical, socio-behavioral, and fundamental biomedical sciences relevant to one's specialty
2.2.	Describe the Royal College of Physicians and Surgeons of Canada (RCPSC) framework of competencies relevant to the physician's specialty
2.3.	Apply lifelong learning skills of the Scholar Role to implement a personal program of keeping up to date with current practices, and enhance areas of professional competence
2.4.	Contribute to the enhancement of quality care and patient safety in practice, integrating the available best evidence and best practices
3.	**Perform a complete and appropriate assessment of patients**
3.1	Effectively identify and explore issues to be addressed in a patient encounter, including the patient's context and preferences
3.2	For the purposes of disease prevention and health promotion, diagnosis, and/or management, prepare a history that is relevant, concise, and accurate to the context and preferences
3.3	For the purposes of disease prevention and health promotion, diagnosis, and/or management, perform a focused physical examination that is relevant and accurate
3.4	Select medically appropriate investigative methods in a resource-effective and ethical manner
3.5	Demonstrate effective clinical problem solving and judgment to address patient problems, including interpreting available data and integrating relevant information to generate differential diagnoses and management plans

4.	**Use preventive and therapeutic interventions effectively**
4.1	Implement an effective management plan in collaboration with a patient and his/her family
4.2	Demonstrate effective, appropriate, and timely application of preventive and therapeutic interventions relevant to the physician's practice
4.3	Ensure that informed consent is obtained for treatments
4.4	Ensure that patients receive appropriate end-of-life care
5.	**Demonstrate proficient and appropriate use of both diagnostic and therapeutic procedural skills**
5.1	Demonstrate effective, appropriate, and timely performance of diagnostic procedures relevant to the practice
5.2	Demonstrate effective, appropriate, and timely performance of therapeutic procedures relevant to the practice
5.3	Ensure appropriate informed consent is obtained for procedures
5.4	Appropriately document and disseminate information related to procedures performed and their outcomes
5.5	Ensure adequate follow up for procedures performed
6.	**Seek appropriate counsel from other health professionals, in recognition of the limits of one's expertise**
6.1	Demonstrate insight into one's own limitations of expertise via self-assessment
6.2	Demonstrate effective, appropriate, and timely consultation of another health professional as needed for optimal patient care
6.3	Arrange appropriate follow-up care services for a patient and his/her family

Communicator

Definition

As *Communicators*, physicians effectively facilitate the doctor–patient relationship and the dynamic exchanges that occur before, during, and after a medical encounter.

Description

Physicians enable patient-centered therapeutic communication through shared decision making and effective dynamic interactions with patients, families, caregivers, other professionals, and important other individuals. The competencies of this Role are essential for establishing rapport and trust, formulating diagnoses, delivering information, striving for mutual understanding, and facilitating a shared plan of care. Poor communication can lead to undesired outcomes, whereas effective communication is critical for optimal patient outcomes. The application of these communication competencies and the nature of the doctor–patient relationship vary for different specialties and forms of medical practice.

Elements

- Patient-centered approach to communication
- Rapport, trust, and ethics in the doctor–patient relationship
- Therapeutic relationships with patients, families, and caregivers
- Diverse doctor–patient relationships for different medical practices

- Shared decision making
- Concordance
- Mutual understanding
- Empathy
- Capacity for compassion, trustworthiness, integrity
- Flexibility in application of skills
- Interactive process
- Relational competence in interactions
- Eliciting and synthesizing information for patient care
- Efficiency
- Accuracy
- Conveying effective oral and written information for patient care
- Effective listening
- Use of expert verbal and non-verbal communication
- Respect for diversity
- Attention to the psychosocial aspects of illnesses
- Breaking of bad news
- Addressing end-of-life issues
- Disclosure of error or adverse events
- Informed consent
- Capacity assessment
- Appropriate documentation
- Public and media communication, where appropriate

Key Competencies: Physicians are able to:

1. Develop rapport, trust, and ethical therapeutic relationships with patients and their families
2. Accurately elicit and synthesize relevant information and the perspectives of patients and their families, colleagues, and other professionals
3. Accurately convey relevant information and explanations to patients and their families, colleagues, and other professionals
4. Develop a common understanding on issues, problems, and plans with patients and their families, colleagues, and other professionals to develop a shared plan of care
5. Convey effective oral and written information on medical encounters

Enabling Competencies: Physicians are able to:

1.	**Develop rapport, trust, and ethical therapeutic relationships with patients and families**
1.1.	Recognize that being a good communicator is a core clinical skill for physicians, and that effective physician–patient communication can foster patient satisfaction, physician satisfaction, adherence to plans, and improved clinical outcomes
1.2.	Establish positive relationships with patients and their families 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 responsive to nonverbal cues
1.6. Effectively facilitate structured clinical encounters

2.	**Accurately elicit and synthesize relevant information and the perspectives of patients and their families, colleagues, and other professionals**
2.1.	Gather information on a disease as well as the patient's beliefs, concerns, expectations, and illness experience
2.2.	Seek out and synthesize relevant information from other sources, such as the patient's family, caregivers, and other professionals

3.	**Accurately convey relevant information and explanations to patients and their families, colleagues, and other professionals**
3.1.	Deliver information to patients and their family, colleagues, and other professionals in a humane and comprehensible manner that encourages discussion and participation in decision making

4.	**Develop a common understanding on issues, problems, and plans with patients, their families, and other professionals to develop a shared plan of care**
4.1.	Effectively identify and explore problems to be addressed from patient encounters, including the patient's context, responses, concerns, and preferences
4.2.	Respect diversity and difference, including but not limited to the impact of gender, religion, and cultural beliefs on decision making
4.3.	Encourage discussion, questions, and interaction
4.4.	Engage patients, their families, and relevant health professionals in shared decision making to develop a plan of care
4.5.	Effectively address challenging communication issues, such as obtaining informed consent, delivering bad news, and addressing anger, confusion, and misunderstanding

5.	**Convey effective oral and written information on medical encounters**
5.1.	Maintain clear, accurate, and appropriate records (e.g., written and electronic) of clinical encounters and plans
5.2.	Effectively present verbal reports of clinical encounters and plans
5.3.	Where appropriate, effectively present medical information to the public or media on a medical issue

Collaborator

Definition

As Collaborators, physicians effectively work within a healthcare team to achieve optimal patient care.

Description

Physicians work in partnership with others who are appropriately involved in the care of individual or a specific group of patients. This collaboration is increasingly important in a modern multi-professional environment, where the goal of patient-centered care is widely shared.

Modern healthcare teams include not only a group of professionals working closely at one site, such as a ward team, but also extended teams with a variety of perspectives and skills in multiple locations. Thus, physicians must be able to collaborate effectively with patients, their families, and an inter-professional team of expert health professionals for the provision of optimal care, education, and scholarship.

Elements

- Collaborative care, culture, and environment
- Shared decision making
- Sharing of knowledge and information
- Delegation of tasks
- Effective teams
- Respect for other physicians and members of the healthcare team
- Respect for diversity
- Team dynamics
- Leadership based on patient needs
- Constructive negotiation
- Resolution, management, and prevention of conflicts
- Organizational structures that facilitate collaboration
- Understanding roles and responsibilities
- Recognizing individual roles and limits
- Effective consultation with respect to collaborative dynamics
- Effective primary care–specialist collaboration
- Collaboration with community agencies
- Communities of practice
- Inter-professional health care
- Multi-professional health care
- Learning together
- Gender issues

Key Competencies: Physicians are able to:

1. Participate effectively and appropriately in an inter-professional healthcare team
2. Effectively work with other health professionals to prevent, negotiate, and resolve inter-professional conflicts

Enabling Competencies: Physicians are able to:

1.	**Participate effectively and appropriately in an inter-professional healthcare team**
1.1.	Clearly describe the roles and responsibilities of all professionals
1.2.	Describe the roles and responsibilities of other professionals within the healthcare team
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. Where appropriate, work with others to assess, plan, provide, and review other tasks, such as research problems, educational work, program review, and administrative responsibilities
1.6. Participate effectively in inter-professional team meetings
1.7. Enter into interdependent relationships with other professionals 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. Where appropriate, demonstrate leadership in a healthcare team

2. Effectively work with other health professionals to prevent, negotiate, and resolve inter-professional conflicts

2.1. Demonstrate a respectful attitude toward other colleagues and members of an inter-professional team
2.2. Work with other professionals to prevent conflicts
2.3. Employ collaborative negotiation to resolve conflicts
2.4. Respect differences, contrasts in opinions, and limitations in other professionals
2.5. Recognize one's own differences, differing views, and limitations that may contribute to inter-professional tension
2.6. Reflect on inter-professional team functions

Manager

Definition

As *Managers*, physicians are integral participants in healthcare organizations. They organize sustainable practices, make decisions on resource allocation, and contribute to the effectiveness of the healthcare system.

Description

Physicians interact with their work environment as individuals, as members of teams or groups, and as participants in the health system at the local, regional, and national levels. The balance in emphasis among these three levels varies depending on the nature of the specialty. Nonetheless, all specialties have explicitly identified management responsibilities as core requirements for the practice of medicine in their discipline.

Physicians function as Managers in their everyday practice activities involving co-workers, resources, and organizational tasks, such as care processes, and policies, with respect to their personal lives. Thus, physicians require the ability to prioritize, execute tasks in collaboration with colleagues, and make systematic choices when allocating scarce healthcare resources. The CanMEDS Manager Role describes the active engagement of all physicians as integral participants in decision making in the operation of the healthcare system.

Elements

- Physicians as active participants in the healthcare system
- Physician roles and responsibilities in the healthcare system
- Collaborative decision making
- Quality assurance and improvement
- Organization, structure, and financing of the healthcare system
- Managing change
- Leadership
- Supervising others
- Administration
- Consideration of justice, efficiency, and effectiveness in the allocation of finite healthcare resources for optimal patient care
- Budgeting and finance
- Priority setting
- Management and maintenance of sustainable practice and physician health
- Human resources
- Time management
- Physician remuneration options
- Negotiation
- Career development
- Information technology for healthcare
- Effective meetings and committees

Key Competencies: Physicians are able:

1. Participate in activities that contribute to the effectiveness of their healthcare organizations and systems
2. Manage their practice and career effectively
3. Allocate finite healthcare resources appropriately
4. Serve in administration and leadership roles, as appropriate

Enabling Competencies: Physicians are able to:

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 process evaluation and improvement, such as patient safety initiatives
1.3.	Describe the structure and function of the healthcare system as it relates to their specialty, including the roles of physicians
1.4.	Describe the 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 their practice, including the aspects of 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 fair allocation of healthcare resources by 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. Introduce or implement changes in healthcare
4.3. Plan relevant elements of healthcare delivery (e.g., work schedules)

Health Advocate

Definition

As *Health Advocates,* physicians responsibly use their expertise and influence to advance the health and well-being of individual patients, communities, and populations.

Description

Physicians recognize their duty and ability to improve the overall health of their patients and society in general. Doctors identify important advocacy activities for individual patients, patient populations, and communities. Individual patients require assistance in navigating the healthcare system and accessing the appropriate health resources in a timely manner. Communities and societies need physicians' special expertise to identify and address broad health issues and the determinants of health. At this level, health advocacy involves efforts to change specific practices or policies. Framed in this multi-level view, health advocacy is an essential and fundamental component of health promotion. Health advocacy is appropriately expressed by both the individual and collective actions of physicians in influencing public health and policy.

Elements

- Advocacy for individual patients, populations, and communities
- Health promotion and disease prevention
- Determinants of health, including psychological, biological, social, cultural, and economic aspects
- Fiduciary duty to care
- The medical profession's role in society
- Responsible use of authority and influence
- Mobilization of resources as needed
- Practice, management, and education adapted to the needs of individual patients
- Patient safety
- Principles of the health policy and its implications
- Interactions of advocacy with other CanMEDS Roles and competencies

Key Competencies: Physicians are able to:

1. Respond to individual patient health needs and issues as part of patient care
2. Respond to the health needs of communities
3. Identify the determinants of health of certain populations
4. Promote the health of individual patients, communities, and populations

Enabling Competencies: Physicians are able to:

1.	**Respond to individual patient health needs and issues as part of patient care**
1.1.	Identify the health needs of individual patients
1.2.	Identify opportunities for advocacy, health promotion, and disease prevention among care targets
2.	**Respond to the health needs of communities**
2.1.	Describe the practice in communities being served
2.2.	Identify opportunities for advocacy, health promotion, and disease prevention in the communities being served, 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 being served**
3.1.	Identify the determinants of health of specific populations, including barriers to access to care and resources
3.2.	Identify vulnerable or marginalized populations within those served and respond appropriately
4.	**Promote the health of individual patients, communities, and populations**
4.1.	Describe an approach to implement change in the determinants of health of the populations served
4.2.	Describe how public policy impacts the health of the populations served
4.3.	Identify points of influence in the healthcare system and its structure
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 the role of 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 patient safety

Scholar

Definition

As *Scholars,* physicians demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application, and translation of medical knowledge.

Description
Physicians engage in a lifelong pursuit of mastering their domain of expertise. As learners, they recognize the need to be continuously learning and model such for others. Through their scholarly activities, they contribute to the creation, dissemination, application, and translation of medical knowledge. As teachers, they facilitate the education of their students, patients, colleagues, and others.

Elements
- Lifelong learning
- Moral and professional obligation to maintain competence; accountability
- Reflection on all aspects of practice
- Self-assessment
- Identifying gaps in knowledge
- Asking effective learning questions
- Accessing information for practice
- Critical appraisal of evidence
- Evidence-based medicine
- Translating knowledge (evidence) into practice
- Translating knowledge into professional competence
- Enhancing professional competence
- Using a variety of learning methodologies
- Principles of learning
- Serving as role model
- Assessing learners
- Giving feedback
- Mentoring
- Teacher–student ethics, power issues, confidentiality, boundaries
- Learning together
- Communities of practice
- Research/scientific inquiry
- Research ethics, disclosure, conflicts of interests, human subjects, and industry relations

Key Competencies: Physicians are able to:
1. Maintain and enhance professional activities through ongoing learning
2. Critically evaluate information and its sources, and apply these appropriately to practice decisions
3. Facilitate the learning of patients, families, students, residents, other health professionals, the public, and others, as appropriate
4. Contribute to the creation, dissemination, application, and translation of new medical knowledge and practices

Enabling Competencies: Physicians are able to:

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 learning issues in practice
1.4.	Audit personal practice
1.5.	Pose appropriate learning questions
1.6.	Access and interpret 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 these appropriately to practice decisions**
2.1.	Describe the principles of critical appraisal
2.2.	Critically appraise retrieved evidence to address clinical questions
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 the principles of learning relevant to medical education
3.2.	Identify the learning needs and desired learning outcomes of others
3.3.	Select effective teaching strategies and content to facilitate others' learning
3.4.	Deliver effective lectures or presentations
3.5.	Assess and reflect on teaching encounters
3.6.	Provide 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
4.2.	Describe the principles of research ethics
4.3.	Pose scholarly questions
4.4.	Conduct a systematic search for evidence
4.5.	Select and apply appropriate methods to address research questions
4.6.	Appropriately disseminate study findings

Professional

Definition

As *Professionals*, physicians are committed to the health and well-being of individuals and society through ethical practice, profession-led regulation, and high personal standards of behavior.

Description
Physicians have a unique societal role as professionals dedicated to the health and care of others. Their practice requires the mastery of a complex body of knowledge and skills, as well as the art of medicine. As such, the Professional Role is guided by codes of ethics and a commitment to clinical competence, appropriate attitudes and behaviors, integrity, altruism, personal well-being, and the promotion of the public good within respective domains. These commitments form the bases of a social contract between physician and society. Society, in turn, grants physicians the privilege of profession-led regulation with the understanding that they are accountable to those served.

Elements
- Altruism
- Integrity and honesty
- Compassion and caring
- Morality and codes of behavior
- Responsibility to society
- Responsibility to the profession, including peer review obligations
- Responsibility to self, including personal care to serve others
- Commitment to excellence in clinical practice and mastery of the discipline
- Commitment to the promotion of the public good in health care
- Accountability to professional regulatory authorities
- Commitment to professional standards
- Bioethical principles and theories
- Medico-legal frameworks governing practice
- Self-awareness
- Sustainable practice and physician health
- Self-assessment
- Disclosure of error or adverse events

Key Competencies: Physicians are able to:
1. Demonstrate commitment to their patients, profession, and society through ethical practice
2. Demonstrate commitment to their patients, profession, and society through participation in profession-led regulation
3. Demonstrate a commitment to physician health and sustainable practice

Enabling Competencies: Physicians are able to:

1.	**Demonstrate commitment to their patients, profession, and society through ethical practice**
1.1.	Exhibit appropriate professional behaviors in practice, including honesty, integrity, commitment, compassion, respect, and altruism
1.2.	Demonstrate a commitment to delivering the highest quality of care and competence
1.3.	Recognize and respond appropriately to ethical issues in practice
1.4.	Appropriately 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 commitment to their patients, profession, and society through participation in profession-led regulation**
2.1.	Appreciate 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 reviews
3.	**Demonstrate 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

Reference

The CanMEDS 2005 Physician Competency Framework, edited by Jason R. Frank. Pages 11-28.

Frank JR, Snell L, Sherbino J, editors. CanMEDS 2015 Physician Competency Framework. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015.).

COMPETENCIES: GENERAL ID ROTATION

At the end of the general ID rotation, ID fellows are expected to achieve the following competencies:

Medical Expert/Clinical Decision Maker

As Medical Experts, infectious diseases fellows integrate a wide range of roles that require medical knowledge, clinical skills, and professional attitudes in the provision of patient-centered care. Infectious diseases fellows must possess a defined body of knowledge and procedural skills for collecting and interpreting data, making appropriate clinical decisions, and carrying out diagnostic and therapeutic procedures within the boundaries of their discipline and expertise. The care provided is characterized by up-to-date, ethical, and cost-effective clinical practice, as well as effective communication in partnership with patients, other health care providers, and the community. The role of the medical expert/clinical decision maker is central to the function of infectious diseases fellows. It draws on the competencies included in the roles of scholar, communicator, health advocate, manager, collaborator, and professional.

Key Competencies

- Function effectively to provide optimal, ethical, and patient-centered medical care
- Establish and maintain clinical knowledge, skills, and attitudes appropriate to the practice
- Perform a complete and appropriate assessment of patients
- Use preventative and therapeutic interventions effectively
- Demonstrate proficient and appropriate use of both diagnostic and therapeutic procedural skills
- Seek appropriate consultations from other health professionals when faced with the limits of their expertise

Enabling Competencies

1. Knowledge

a) Etiology, epidemiology, pathogenesis, natural history, pathology, clinical features, prevention, and management of the following:

i. Acute and chronic infectious diseases
ii. Febrile patients, specifically presenting in association with rash or as fever of unknown origin
iii. Mycobacterial infections
iv. Sexually transmitted diseases
v. Infections in travelers, including people coming for the Hajj and Umrah
vi. Healthcare-associated infections
vii. Specific infectious diseases in pregnant patients
viii. Infections in surgery and gynecology patients
ix. Skin and soft tissue infections: cellulitis, diabetic foot infection, wound infections, and pressure ulcers
x. Infections occurring after burns and extensive trauma
xi. Infections in the intensive care unit
xii. Infections occurring as a result of emerging pathogens

xiii. Viral hepatitis
xiv. Bacteremia, sepsis, and septic shock
xv. Respiratory diseases: community- or healthcare-associated pneumonia, empyema
xvi. Zoonotic infections: Brucellosis
xvii. Cardiovascular infections: endocarditis
xviii. Gastrointestinal diseases: gastroenteritis, intra-abdominal infections
xix. Urinary and genital tract infections
xx. CNS: meningitis/encephalitis
xxi. Bone and joint infections
xxii. Medical device-related infections: lines, prostheses, ventilator, urinary catheter, shunts, hardware
xxiii. Fungal infections, including yeasts, molds, and dimorphic fungus
xxiv. Parasitic infections from protozoa and helminthes

b) Immunology, including the following:
i. Details of innate and adoptive immunity
ii. Pathogenic mechanisms through which immune responses facilitate or prevent disease
iii. Principles and practice of immunization techniques together with adverse effects and efficacy of immunizing agents
iv. Immunological evaluation of patients with recurrent infections

c) Principles and practice of prevention of infection by immunization and chemoprophylaxis, including the indications, contraindications, efficacy, effectiveness, and adverse effects of the following:
i. Passive and active immunization
ii. Chemoprophylaxis, including surgical perioperative chemoprophylaxis
iii. Environmental and behavior factors

d) Antimicrobial agents and other treatment options for infectious diseases:
i. Classification
ii. Spectrum of activity
iii. Pharmacokinetics and pharmacodynamics in normal and abnormal hosts
iv. Mechanism of action
v. Mechanism of resistance
vi. Toxicity and drug interactions
vii. Clinical indications and use
viii. Principles of pharmacoeconomics
ix. History of microbiology and infectious diseases with awareness of major changes that have occurred in disease epidemiology and pathogenesis

2. Skills

a) Prepare a medical history that is relevant, concise, accurate, and appropriate to the patient's problem(s), including the relevant epidemiologic and travel history related to particular infectious diseases
b) Perform a physical examination that is relevant, detailed, appropriate, and according to specialty-specific standards
c) Select medically appropriate investigative tools, including microbiologic tests, in a cost-effective, ethical, and useful manner
d) Retrieve and implement the information necessary to provide healthcare services to patients
e) Access, retrieve, appraise, and apply all types of information relevant to problem-solving and introduce new therapeutic options to the clinical practice of treating infectious diseases
f) Anticipate the short- and long-term complications of infectious diseases and their treatments
g) Appropriately deliver patient/family education using the abovementioned knowledge
h) Demonstrate insight into personal limitations.

Communicator

As Communicators, infectious diseases fellows effectively facilitate the doctor–patient relationship and the dynamic exchanges that occur before, during, and after a medical encounter.

Infectious diseases fellows enable patient-centered therapeutic communication through shared decision making and effective dynamic interactions with patients, families, caregivers, other professionals, and other important individuals. The competencies of this role are essential for establishing rapport and trust, formulating diagnoses, delivering information, striving for mutual understanding, and facilitating a shared plan of care. Poor communication can lead to undesired outcomes. Effective communication is critical for optimal patient outcomes.

Key Competencies

- Develop rapport, trust, and ethical therapeutic relationships with patients and families
- Accurately elicit and synthesize the relevant information and perspectives of patients and their families, colleagues, and other professionals
- Accurately convey relevant information and explanations to patients and their families, colleagues, and other professionals
- Develop a common understanding of issues, problems, and plans with patients their and families, colleagues, and other professionals to develop a shared plan of care
- Convey effective oral and written information on medical encounters

Enabling Competencies

a) Demonstrate the skills to impart infectious diseases-related knowledge to patients, colleagues, hospital staff, and the general public
Fellows should recognize that being a good communicator is an essential function of a physician.

They must understand that effective patient–physician communication can foster patient satisfaction and compliance as well as influence the manifestations and outcome of a patient's illness.

b) Establish a relationship with the patient that should be characterized by understanding, trust, respect, empathy, and confidentiality

c) Gather information on a particular infectious disease affecting a patient and then obtain information about the patient's beliefs, concerns, and expectations as regards their illness, in a sensitive and caring manner

These aspects should be considered within the context of the influence of age, gender, ethnicity, cultural and socio-economic status, and spiritual values. Wherever appropriate, critical information in the above categories must be communicated to others involved in the care of the patient.

d) Succinctly present key information to patients and their families in a manner that enables them to be active participants in decision making related to the infectious diseases affecting them

e) Be aware of the potential for mixed messages to be delivered to patients and their families, particularly in relation to choice of diagnostic procedures, antimicrobial agents, and duration of antimicrobial therapy

Fellows must communicate with other health professionals in a manner that facilitates the delivery of consistent messages to the patients and their families.

f) Master the basic principles that guide the provision of information to the general public and media on issues of local concern

Such issues may apply (but are not limited) to natural communicable disease outbreaks, potential threats such as bioterrorism, antimicrobial resistance, and inappropriate resource utilization.

Collaborator

As Collaborators, infectious diseases physicians effectively work within a healthcare team to achieve optimal patient care.

Infectious diseases physicians work in partnership with others who are appropriately involved in the care of individuals or specific groups of patients. This setup is increasingly important in a modern multi-professional environment, where the goal of patient-centered care is widely shared.

Modern healthcare teams include not only a group of professionals working closely at one site, such as a ward team, but also extended teams with a variety of perspectives and skills, in multiple locations. Thus, infectious diseases physicians need to be able to collaborate effectively with patients and their families, as well as an integrated team of health professional experts for the provision of optimal care, education, and scholarship.

Key Competencies

- Participate effectively and appropriately in an inter-professional healthcare team, including laboratory personnel, infection control practitioners, and public health personnel
- Effectively work with other health professionals to prevent, negotiate, and resolve inter-professional conflict

Enabling Competencies

a) Become familiar with the role and functions of an infectious diseases specialist in the hospital infection control committee and in the pharmacy and therapeutics committee

b) Be aware of the pivotal role of other health care providers in facilitating the activities of infectious diseases specialists
Such individuals include, but are not limited to, those performing surgical and radiological diagnostic procedures for microbiological examination.

c) Demonstrate the ability to accept, consider, and respect the opinions of other team members

d) Be able to describe how healthcare governance influences the delivery of infectious diseases-related care, research, and educational activities at the local, provincial, regional, and national levels

e) Be capable of assuming a decisive role while functioning as a member of a multidisciplinary team

f) Understand the importance of interacting with local and international ID specialists and microbiologists to recognize variation in the local epidemiology of organisms and resistance patterns

Manager

As Managers, infectious diseases fellows should be aware of the role of ID physicians as integral participants in healthcare organizations: organizing sustainable practices, making decisions on resource allocation, and contributing to the effectiveness of the healthcare system.

Infectious diseases fellows should interact with their work environment as individuals, as members of teams or groups, and as participants in the local, regional, national, and international health system. The need to balance interaction among these four levels is possibly more important for infectious diseases physicians than for any other medical specialty or subspecialty, and is a core requirement for the practice. Infectious diseases physicians function as Managers in their everyday practice activities involving colleagues, resources, and organizational tasks, such as care processes and policies, in the context of balancing their personal lives. Thus, physicians require the ability to prioritize, execute tasks in collaboration with colleagues, and make systematic choices when allocating scarce healthcare resources.

Key Competencies

- Participate in activities that contribute to the effectiveness of their healthcare organizations and systems
- Manage their practice and career effectively
- Allocate finite healthcare resources appropriately
- Serve in administration and leadership roles, as appropriate

Enabling Competencies

a) Demonstrate an understanding of the structure, financing, and operation of the Saudi heathcare system

b) Demonstrate knowledge of the following:
   i. Infection control to prevent diseases and investigate outbreaks of infectious illnesses in the hospital and community setting
   ii. Pharmacotherapy that would enable one to participate in the selection for the hospital's antimicrobial agents and immunization products, with consideration for cost effectiveness
   iii. Functioning effectively in the healthcare organizations at the local, regional, and national levels
   iv. The different ways of delivering care to patients with a variety of infectious diseases in different settings, including the ability to participate in the planning, budgeting, and evaluation of special modes of delivering infectious diseases care (e.g., outpatient parenteral antibiotic therapy and directly observed therapy)
   v. Practice and time management skills, including punctuality, prioritization, and triage

c) Demonstrate ability in the following:
   i. Access and apply a broad base of information to the care of patients in ambulatory care, hospitals, and other healthcare settings, including knowledge of the most cost-effective laboratory procedures
   ii. Make and defend clinical decisions and judgments based on sound clinical evidence for the benefit of individual patients and the population served
   iii. Use information technology as a tool in patient management

Health Advocate

As Health Advocates, infectious diseases fellows use their expertise and influence responsibly to advance the health and well-being of individual patients, communities, and populations. Infectious diseases fellows recognize their duty and ability to improve the overall health of their patients and the society at large. They identify advocacy activities as important for the individual patient, populations of patients, and communities. Individual patients need assistance in navigating the healthcare system and accessing the appropriate health resources in a timely manner. Communities and societies need physicians' special expertise to identify and address broad health issues, including the determinants of health. At this level, health advocacy involves efforts to change specific practices or policies on behalf of those served. Framed in this multi-level view, health advocacy is an essential and fundamental component of health promotion. Health advocacy is appropriately expressed both by the individual and collective action of physicians in influencing public health and policy.

Key Competencies

- Respond to individual patient health needs and issues as part of patient care
- Respond to the health needs of the communities being served
- Identify the determinants of health of the populations being served
- Promote the health of individual patients, communities, and populations

Enabling Competencies

a) Apply knowledge of epidemiology, etiology, and pathogenesis to prevent the development of and manage infectious diseases. Thus, fellows should demonstrate an understanding of the following:
   i. The most important determinants of health in relation to the burden of illness from diseases caused directly or indirectly by microorganisms
   ii. The development of policies related to infectious diseases and public health; the current policies that affect health, either positively or negatively, such as childhood immunizations, infection control, and antimicrobial utilization
   iii. The unique and far-reaching impacts of antimicrobial choices that not only have implications for the individual patient but also on the epidemiology of infections in the hospital and community
   iv. The need to advocate for the appropriate and judicious use of antimicrobials to minimize the emergence of resistance

b) Have an understanding of the above concepts to identify the following:
   i. The biological, psychosocial, cultural, environmental, and economic determinants of health and use this information in a management plan; patient access to relevant public health and social services required to manage particular microbial diseases, such as HIV, sexually transmitted diseases, tuberculosis, and vaccine-preventable diseases
   ii. Patient groups at risk of infectious diseases and their consequences to target primary and secondary preventive strategies (HIV, sexually transmitted diseases, tuberculosis, and vaccine-preventable diseases)
   iii. Key issues and opportunities to reduce or minimize the morbidity and mortality from infectious diseases

Scholar

As Scholars, infectious diseases fellows demonstrate a lifelong commitment to reflective learning, as well as the creation, dissemination, application, and translation of medical knowledge.

Infectious diseases fellows engage in a lifelong pursuit of mastering their domain of expertise. As learners, they recognize the need to be continually learning and model the same for others. Through their scholarly activities, they contribute to the creation, dissemination, application, and translation of medical knowledge. As teachers, they facilitate the education of their students, patients, colleagues, and others.

Key Competencies

- Maintain and enhance professional activities through ongoing learning
- Critically evaluate information and its sources, and apply this appropriately to decisions in practice
- Facilitate the learning of patients and their families, students, residents, other health professionals, the public, and others, as appropriate
- Contribute to the creation, dissemination, application, and translation of new medical knowledge and practices

Enabling Competencies

1. Clinical

a) Pose clinical infectious disease questions
b) Recognize and identify gaps in knowledge and expertise around clinical questions
c) Formulate a plan to bridge the identified gap, including the following steps:
   i. Conduct an appropriate literature search based on the clinical question
   ii. Collate and appraise the literature
   iii. Develop a system to store and retrieve relevant literature
   iv. Consult others (physicians and other health professionals) in a collegial manner
   v. Propose solutions to clinical questions
   vi. Implement the solutions in practice; evaluate the outcomes and then reassess the solution (re-enter the loop at ci) or cii)
   vii. Identify practice areas for research

2. Research

a) Pose an infectious diseases research question (clinical, basic, or population health)
b) Develop a proposal to solve the research question:
   i. Conduct an appropriate literature search based on the research question
   ii. Identify, consult, and collaborate with appropriate content experts to conduct the research
   iii. Propose a methodological approach to solve the question
   iv. Carry out the research outlined in the proposal
   v. Defend and disseminate the results of the research
   vi. Identify areas for further research based on the results

3. Education

a) Show an appreciation of infectious diseases literature with the ability to evaluate it critically and apply the results
b) Demonstrate an understanding of preferred learning methods in dealing with students, residents, and colleagues

Professional

As Professionals, infectious diseases fellows are committed to the health and well-being of individuals and society through ethical practice, profession-led regulation, and high personal standards of behavior.

Fellows have a unique societal role as professionals dedicated to the health and care of others. Their work requires the mastery of a complex body of knowledge and skills, as well as the art of medicine. As such, the Professional Role is guided by codes of ethic and a commitment to clinical competence, adherence to appropriate attitudes and behaviors, integrity, altruism, personal well-being, and the promotion of the public good. These commitments form the bases of a social contract between physician and society. Society, in turn, grants physicians the privilege of profession-led regulation with the understanding that they are accountable to those served.

Key Competencies

- Demonstrate a commitment to patients, the profession, and society through ethical practice
- Demonstrate a commitment to patients, the profession, and society through participation in profession-led regulation
- Demonstrate a commitment to physician health and sustainable practice

Enabling Competencies

1. Discipline-Based Objectives:

a) Display attitudes commonly accepted as essential to professionalism
b) Use appropriate strategies to maintain and advance professional competence
c) Evaluate continually one's abilities, knowledge, and skills; recognize one's limitations in professional competence; adopt the willingness to call upon others with special expertise as appropriate

2. Personal/Professional Boundary Objectives:

a) Adopt specific strategies to heighten personal and professional awareness; explore and resolve interpersonal difficulties in professional relationships
b) Strive consciously to balance personal and professional roles and responsibilities; demonstrate ways of attempting to resolve conflicts and role strain
c) Demonstrate flexibility and a willingness to adjust to changing circumstances

3. Objectives Related to Ethics and Professional Bodies:

a) Know and understand the professional, legal, and ethical codes to which infectious diseases physicians are bound:
   i. Confidentiality issues critical to the proper practice of infectious disease care (e.g., HIV disclosure)
   ii. Appropriate conduct when interacting within the industry, including the manufacturers and distributors of antimicrobials and diagnostics products
b) Recognize, analyze, and attempt to resolve in clinical practice ethical issues, such as honesty, reliability, informed consent, advanced directives, confidentiality, end-of-life care, conflict of interest, resource allocation, and research ethics
c) Understand and apply relevant legislation relating to the healthcare system as guidelines to clinical practice
d) Recognize, analyze, and deal with unprofessional behaviors in clinical practice, taking into account local and provincial regulations

COMPETENCIES: MICROBIOLOGY ROTATION

The purpose of the rotation is to provide the fellows with knowledge of clinical laboratory, thereby fostering advanced understanding of the mechanisms by which specimens are processed, organisms identified, susceptibility testing performed, and test results reported. The fellows will also gain an appreciation of the limitations of these methods (e.g., sensitivity, specificity, positive and negative predictive values) and an understanding of the impact on resources with specific test requests. The fellows will understand the biosafety regulations for handling different classes of microbial pathogens. An understanding of the host–parasite relationship will yield a good grasp of virulence factors associated with typical pathogens.

Fellow are expected to be present in the clinical laboratory unless attending other activities specifically related to their microbiology/ID training. Fellows should inform the medical microbiologist or technologist involved of activities that will take them away from the laboratory (e.g., attending ID clinic). As the majority of clinical microbiology is done in the morning, fellows are encouraged to be in the laboratory during their microbiology rotation.
These objectives are to form the guidelines for the rotation; the list is not exhaustive.

Specimen Processing

Fellows are expected to be able to discuss the following:

1. The appropriate collection methods for all specimens submitted to the medical microbiology laboratory, indications for different transport media, and rejection/acceptance criteria for specimens submitted to the lab
2. The methods by which the original microbial population of the specimen is maintained as specimens
3. The method by which specimens are processed to produce clinically relevant results
4. The indications for different media and different incubation conditions

Fellows are encouraged to be able to perform the following:

1. Inoculate the primary plates for all types of specimens, and set up and stain smears of clinical specimens
2. Identify and quantify the different types of bacterial morphs in the smears

Blood/sterile body fluids bench

Fellow are expected to be able to discuss the following:

1. The pathogenesis of bloodstream infections and their diagnosis in the laboratory
2. The principles behind automated and manual blood culture systems, their respective limitations (e.g., recovery of fastidious pathogens), and types of media available
3. The criteria to classify blood culture isolates as likely pathogens or contaminants
    i. Advice for users regarding the appropriate collection method and number of blood cultures needed to diagnose a bloodstream infection
    ii. Subculturing in appropriate media and direct susceptibility testing for positive blood cultures
    iii. Propose a list of probable organisms based on the Gram staining results

iv. The collection methods for various body fluids and their proper handling to preserve their clinical value
v. The processing methods for improving the Gram staining sensitivity of CSF and differential cell counting
vi. The sensitivity and specificity of antigen detection methods for the following pathogens from CSF: Cryptococcus neoformans, Homophiles influenza, Neisseria meningitides, Streptococcus pneumonia, E. coli, and group B Streptococcus
vii. Fellows should identify cerebrospinal pathogens, including the above and Listeria monoctogenes.

Wounds/Tissues/Anaerobic Organisms/Genital Bench (General Bench GB)

Fellow will have knowledge of the normal flora for the different sites on the human body and the bacterial pathogens with intrinsic ability to cause skin and soft tissue infections. They will be trained to:

1. Read Gram staining of samples from various body sites and then select the proper empirical antimicrobial therapy
2. Identify the intrinsic pathogens of skin and soft tissue infections
3. Determine the sensitivity and specificity of direct Gram staining for urethral and endocervical specimens in symptomatic patients and the usefulness of the same method in the investigation of sexually transmitted diseases
4. Perform the appropriate methods for the collection/transport of genital specimens
5. Perform the various serological tests used for diagnosis of syphilis.
6. Investigate chlamydia trachomatis infections, including EIA, DFA, and DNA amplifications, and their limitations
7. Identify the specimens appropriate for anaerobic culture
8. Master the principles and methods for identifying anaerobic organisms (e.g., Wadsworth manual method)

Fellow are expected to identify the 1) indications and limitations of anaerobic susceptibility testing, and 2) current susceptibility profiles of common anaerobic pathogens, based on the microscopic appearance and presence of Trichomonas vaginalis, candida vaginitis, bacterial vaginosis in a vaginal specimen, and Neisseria gonorrhea in a patient with gonococcal urethritis or cervicitis.

Urine Bench

Fellow must be able to discuss the following:

1. Significant bacteruria and the appropriate laboratory processes for specimens
2. The sensitivity and specificity of the various urine screening systems available

Fellows should be able to:

1. Quantify urine culture results and predict clinical significance
2. Identify the typical urinary pathogens based on an understanding of biochemical tests: E. coli, Staphylococcus saprophyticus, and Enterococcus

Stool/Parasitology Bench

Fellows must be able to discuss:

1. The virulence features of various enteric pathogens
2. The appropriate sample to be submitted for the investigation of suspected gastroenteritis and food poisoning, such as botulism
3. The virulence factors associated with clostridium difficile and the relevant detection methods, based on knowledge of clinical utility and test limitations
4. The microbiological diagnosis of Helicobacter pylori infections

Fellows must be able to isolate enteric bacterial pathogens from a stool specimen and then identify Campylobacter, Salmonella, Shiegella, Yersinia, and E. coli O157:H7.

Fellow shall be able to discuss:

1. The proper collection methods for stool examination for parasites
2. The life cycle of clinically important parasites
3. The frequent enteric parasites with the various concentration methods and staining procedures

Respiratory/Mycology Bench

Fellows are expected to be able to discuss:

1. The reasons for the cytological screening of sputum samples and the proper collection of throat swabs for bacterial and viral investigations
2. The principle of direct fluorescent antibody assays and those available for the detection of various respiratory pathogens
3. The handling of different types of bronchoscopy specimens, including bronchoalveolar lavage, protected specimen brush, and bronchial aspirates, and the sensitivity and specificity of each
4. The appropriate reinvestigations for different types of immunocompromised hosts
5. The diagnosis of legionella infections, M. catarrahlis, S. aureus, and P. aeruroginosa
6. The proper method for specimen collection and submission for the proper investigation of human fungal infection

Fellows are expected to be able to:

1. Determine the appropriate/inappropriate respiratory specimens for culture
2. Identify common respiratory pathogens, including S. pneumonia and H. influenzae
3. Perform a KOH wet preparation and/or calcofluor white stain
4. Recognize the presence of fungal elements in direct specimens
5. Perform and interpret a germ tube test
6. Identify the typical features of Aspergilluss, Zygomycetes, Cryptococcuss, and dimorphic fungi

Mycobacteriology Bench

Fellow must be able to discuss:

1. The appropriate specimens for investigating mycobacterial diseases
2. The bases for acid fastness and the sensitivity of direct and concentrated acid fast stains
3. The various methods used for culture, species identification (including DNA probes), and susceptibility testing of mycobacteria

Fellows are expected to be able to:

1. Perform and interpret a direct acid fast stain
2. Recognize the presence of mycobacteria from primary specimens and pure cultures
3. Interpret the clinical significance of a culture report

Susceptibility Testing

Fellows must be able to discuss:

1. The reference methods of susceptibility testing
2. The organisms that do not typically require susceptibility testing
3. The methods used to determine antimicrobial levels and the appropriate indications
4. The methods used for minimum inhibitory and bactericidal concentration testing as well as the appropriate indications and limitations
5. The methods for preparing serum bactericidal titers, as well as their indications and limitations
6. The action mechanism of various antimicrobial agents and resistance mechanism of common pathogens
7. The concept of synergy, including the organisms commonly used in synergy studies
8. The clinical significance and screening methods for MRSA, VRE, and PRSP

Fellows must be able to:

1. Set up the disc diffusion and automated susceptibility testing system, including the chromogenic cephalosporin
2. Set up and interpret an MBC assay and a serum bactericidal titer (if requested)

COMPETENCIES: SEROLOGY AND MOLECULAR INFECTIOUS DISEASES

I. Serology methods

A. Antibody Detection

Each trainee will become familiar with procedures and assays for detecting and quantifying the level of IgG class antibodies in blood specimens for appropriate viral, bacterial, parasitic, and fungal infections. Each trainee will be trained in the serologic tests and interpretation of results for IgM class antibodies measured in microbial infections. Each trainee will learn the principle of each assay for measuring antibodies that indicate microbial infection. These assays include enzyme immunoassay, immunofluorescence, agglutination/flocculation, Western blot, and rapid card (horizontal diffusion) tests. Trainees will become familiar with the operation of automated instruments (ETIMax-2000, Architect, ELISA plates, and spectrophotometer) for fluid volume handling and antigen/antibody detection formats. Trainees will know the microbial infections and the serologic results useful for detecting immunity, diagnosing acute phase infection, or assessing post infection.

B. Antigen Detection

Trainees will become familiar with the microbial infections and the antigen detection methods useful for obtaining laboratory diagnoses. Trainees will learn the manual methods and automated instruments for the detection of antigens in urine specimens.

II. Molecular methods

Trainees will study the optimal specimen types for the detection of microbial infections by real-time PCR. Trainees will be able to extract target nucleic acids using manual (i.e., QiaAmp) and automated (EZ1AdvanceXL, COBAS AmpliPrep, and others) methods. Trainees will be able to test blood specimens for the quantification of Cytomegalovirus and Epstein-Barr virus DNA, as well as test nasopharyngeal aspirates for seasonal flu, including H1N1 virus, using real-time PCR methods. Trainees test blood specimens for the quantification of HBV, HCV, CMV, and HIV viruses using COBAS TaqMan 48 or Abbott Analyzer. Trainees will test respiratory samples for the detection of respiratory viruses by multiplex PCR and gel electrophoresis. Trainees will learn the principles and interpretation of results obtained with quantitative real-time PCR assays, as well as NAT testing for blood donors using the s 201 system.

Upon completion of the training program, trainees will learn the following:

1. The immunologic principles of the various assays for the detection of viral antigens and of antiviral antibodies for the serologic diagnosis of viral hepatitis and HIV infection
2. The laboratory procedures of each serologic assay
3. The advantages and disadvantages of each serologic assay
4. The rationale for the recommended laboratory testing algorithms in screening and confirming the presence of HBV, HCV, and HIV infections
5. The proper interpretation of serologic test results with consideration for individual patients' clinical history and other laboratory findings, and formulation of advice for additional laboratory testing

6. The scientific principles of the various laboratory methods for nucleic acid (DNA and RNA) extraction and purification
7. The scientific principles of the various qualitative and quantitative methods for the detection of viral nucleic acids in the diagnosis and monitoring of HBV, HCV, and HIV infections
8. The laboratory procedures of each nucleic acid extraction/purification method and each molecular assay
9. The advantages and disadvantages of each extraction/purification method and each molecular assay
10. The rationale for the use of various molecular tests recommended in the confirmation and monitoring of HBV, HCV, and HIV infections
11. The proper interpretation of molecular test results with respect to a patient's clinical history and other laboratory findings (including serologic tests), and provision of advice for additional laboratory testing

Educational Seminars

Fellows are expected to present to the lab staff the common microbiological issues in the pre-analytical, analytical, and post-analytical phases of specimen processing/troubleshooting. They are encouraged to present "bug of the week" where a rarely isolated organism is reported in the lab with an updated microbiological/clinical review of literature.

COMPETENCIES: INFECTIOUS COMPLICATIONS IN IMMUNOCOMPROMISED HOSTS

(Infectious diseases in transplant recipients, patients with Hematologic malignancies, and AIDS patients)

Section 1

Immunology

- To grasp basic immunologic concepts in innate and adaptive immune systems

Section 2

Infectious Diseases in Immunocompromised Hosts

The patient population includes patients listed for consideration for solid organ transplantation, those with the status of post solid organ transplantation, those with leukemia or lymphoma undergoing chemotherapy, those undergoing stem cell transplantation, and those with cystic fibrosis.

Teaching takes place at daily attending rounds and includes a review of specified didactic topics.

A. Infectious diseases in solid organ transplant recipients

Objectives

1. To understand the principles of immune suppressive regimens given as induction pre-transplant therapy and antirejection medications, their basic mechanism of action, their effect on the host immune system, their effect on the net state of immunosuppression, and their commonly encountered side effects
2. To understand the timeline of risk for various infections following transplantation
3. To understand the basic pharmacologic interactions between principal immunosuppressive agents and commonly used antibacterial, antifungal, and antiviral agents
4. To understand the basic principles of pre-transplant screening to identify patients who are at risk of reactivation of latent infections, and to understand the principle and benefit of targeted prophylaxis
5. To understand the basic concept of donor-derived infections, including developing the decision-making ability as regards accepting or declining potential donors based on their risk of transmitting infections
6. To understand the basic surgical complications of solid organ transplantation procedures that may lead to certain infections
7. To understand strategies for the prevention of infection in these patients, including the use of prophylactic and preemptive strategies
8. To learn to obtain a comprehensive and accurate medical history using all available sources
9. To learn how to investigate, detect, and manage donor-derived infections
10. To identify the major pathogens of opportunistic and other common infections as well as the major clinical syndromes that occur in SOT recipients

This item includes understanding the appropriate medical history, including potential exposures, physical examination, imaging, and laboratory diagnostics, as well as management of those infections. Commonly encountered diseases that should be covered include viral infections (cytomegalovirus, Epstein-Barr virus, varicella-zoster virus, other herpes viruses, BK virus, hepatitis viruses, and community-acquired respiratory viruses), mycobacterial infections (tuberculosis, nontuberculous mycobacteria), fungal infections (Candida, Aspergillus, and rare molds), and bacterial infections (including Nocardia and emerging multi-drug resistant bacteria: Pseudomonas, carbapenem-resistant bacteria, Klebsiella pneumoniae, Acinetobacter baumannii, methicillin-resistant Staphylococcus aureus, and vancomycin-resistant Enterococcus).

11. To understand the principal diagnostic modalities, including radiology, microbiology (including molecular and immunologic diagnostic assays), and histopathology, along with the most effective application and limitations of each in the patient population
12. Fellows should be introduced to the evolving assays that assess general immune system function as well as organism-specific immunity.
13. To understand the principles of treatment of infections in these patients, and how these patients differ from non-immunocompromised hosts in terms of therapeutic response and therapeutic urgency
14. To become comfortable in dealing with life-threatening infections and critically ill transplant patients and their families
15. To appreciate the risks associated with hospitalization at transplant, including but not limited to infection control and prevention policies, hand hygiene, surgical site infections, and infection related to instrumentation
16. To perform comprehensive follow up for infectious episode in the outpatient setting
17. To understand outpatient evaluation for transplant recipients planning travel and the need for continued review of immunization status after transplantation

B. Infectious diseases in stem cell transplant recipients and patients with hematologic and non-hematologic malignancies

Objectives

1. To learn the immunosuppressive effect of commonly used chemotherapeutic regimens to treat hematologic malignancies
2. To learn the basic side effects of commonly used immunosuppressive agents and chemotherapeutic regimens that may be confused with infectious complications
3. To learn the basic principles of the stem cell transplant procedure, including the pre-transplantation clinical assessment, including risk based on hematopoietic stem cell transplantation (HSCT) pre-transplant conditioning regimen (myelo ablative vs. reduced-intensity), HSCT modality (allogeneic vs. autologous, related, unrelated, and cord blood donors), and donor assessment, including vaccination
4. To learn the different stages of the pre-stem cell transplant period and the corresponding infection risk associated with the time period (pre-engraftment, early post-engraftment, late post-engraftment)
5. To understand the differences in the concept of donor-derived infection between solid organ and stem cell transplant recipients

6. To learn to detect, investigate, and manage donor-derived infections in stem cell transplant recipients
7. To learn the basic clinical and laboratory manifestations of graft versus host disease that can be difficult to discern from infectious complications
8. To identify the major pathogens of opportunistic and other common infections as well as the major clinical syndromes that occur in SCT recipients.
9. This item includes understanding the appropriate medical history, including potential exposures, physical examination, imaging, and laboratory diagnostics, as well as management of those infections. Commonly encountered diseases that should be covered include viral infections (cytomegalovirus, Epstein-Barr virus, varicella-zoster virus, other herpes viruses, BK virus, hepatitis viruses, and community-acquired respiratory viruses), mycobacterial infections (tuberculosis, nontuberculous mycobacteria), fungal infections (Candida, Aspergillus, and rare molds), and bacterial infections (including Nocardia and emerging multi-drug-resistant bacteria: Pseudomonas, carbapenem-resistant bacteria, Klebsiella pneumoniae, Acinetobacter baumannii, methicillin-resistant Staphylococcus aurous, and vancomycin-resistant Enterococcus)
10. To understand the principal diagnostic modalities, including radiology, microbiology (including molecular and immunologic diagnostic assays), and histopathology, along with the most effective application and limitations of each in the patient population
11. To describe the commendations and rational for revaccination after SCT

C. Infections in patients with congenital immunodeficiency on biological agents

Objectives

1. To understand the effect of biological agents on the immune system
2. To learn essential screening and prophylaxis prior to the initiation of biological agents
3. To learn the common infections associated with biological agents
4. To understand different congenital immunodeficiency syndromes, such as common variable immunodeficiency, chronic granulomatous diseases, and IgA deficiency, and their effect on the immune system
5. To learn the common infections associated with each of these immune deficiency syndromes

Section 3

HIV Infection

The ID fellow will gain a broad experience in the evaluation and management of both outpatients and hospitalized adult patients with HIV infection.

Objectives

1. To understand the modes of transmission and their associated risks
2. To understand the clinical presentation and management of acute retroviral syndrome
3. To learn to detect, investigate and manage opportunistic infections in HIV/AIDS patients

4. To learn how to utilize molecular assays to investigate and diagnose disease-causing pathogens in HIV/AIDS patients
5. To learn the indications of primary and secondary prophylaxis of opportunistic infections in patients infected with HIV
6. To learn how to manage antiretroviral medications, their side effects, and how to adjust the antiretroviral treatment regimens when necessary
7. To learn the importance of administering different vaccines and the limited immune response that may be induced by them depending on the immune status of the HIV patients
8. To learn the concept of pre-exposure prophylaxis (PrEP), the evidence behind it, and the target population
9. To learn the importance of public health education in preventing infection and providing counseling and psychosocial support for newly diagnosed patients and their spouses and families

A. Antiretroviral treatment

1. Learn the different classes of antiretroviral treatment and their mechanism of action
2. Learn the recommended antiretroviral combination regimens
3. Learn the adverse effects of antiretroviral treatment and how to manage them
4. Learn how to manage interactions between antiretroviral treatment and other medications
5. Learn how to tailor antiretroviral treatment to individuals with comorbid conditions or hepatitis B/C co-infections
6. Learn how to manage antiretroviral treatment in pregnant women and how to assess the risk of perinatal transmission of HIV

B. Opportunistic infections in HIV/AIDS patients

Learn how to detect, diagnose, and treat HIV/AIDS patients with the following scenarios:
Fellows should learn the differential diagnosis, ways to narrow down the differential and pursue the correct diagnosis, and ways to treat these patients with the following clinical scenarios:

1. HIV/AIDS patient with a central nervous system space-occupying lesion
2. HIV/AIDS patients with shortness of breath and abnormal chest radiography
3. HIV/AIDS patients with fever of unknown origin

Commonly encountered diseases that should be covered include mycobacterial infections (tuberculosis, nontuberculous mycobacteria), fungal infections (Pneumocystis *jirovicii*, Cryptococcus, Candida, Aspergillus, and rare molds), and bacterial infections (including Syphilis, Nocardia, bartonella, and emerging multi-drug-resistant bacteria: Pseudomonas, carbapenem-resistant bacteria, Klebsiella pneumoniae, Acinetobacter baumannii, methicillin-resistant Staphylococcus aurous, and vancomycin-resistant Enterococcus, viral infections, cytomegalovirus, Epstein-Barr virus, varicella-zoster virus, other herpes viruses, hepatitis viruses, Human Papillomavirus, and community-acquired respiratory viruses), and parasitic infections (Toxoplasma, cryptosporidium, microsporidium, entameba, echinococcus, and cystecercosis).

C. Outpatient management of HIV-infected patients

1. Determining when to initiate antiretroviral therapy
2. Appropriate prescribing of first-line antiretroviral therapy
3. Use of resistance testing and selection of salvage therapy
4. Appropriate prescribing of prophylaxis for opportunistic infections
5. Providing appropriate primary care to HIV-infected patients
6. Management of opportunistic infections, sexually transmitted diseases, and learning to address the family planning issue

Infectious Diseases Subspecialty Fellows Rotation In Pediatrics

ID subspecialty fellows are required to be familiar with infectious diseases in the pediatric population. They are required to spend a four-week rotation in patient consultation service. They are directly supervised by the attending physician faculty member in all aspects of clinical care and performance. The inpatient consultation experience includes consultation on every inpatient service. Educational activities and teaching methods include textbook reading, conferences (Journal Club, Clinical Conference Research Conference, Subspecialty Residents Core Didactic Conference, Immunology Review Conference, and Pediatrics Grand Rounds), web-based information, small group discussion, literature review, and review of laboratory and pathology data. Independence and responsibility are expected and required as the fellows improve their overall skills.

Goals and Objectives

The overall goal of the experience is to familiarize the fellows in infectious disease in aspects of the diagnosis of common and complex pediatric infectious diseases. This would include the recognition of clinical differences in diseases in the pediatric population compared with adults, including the necessity of proper dosing of antimicrobial agents.

SECOND-YEAR FELLOW RESEARCH ROTATION SYLLABUS

Description

The Saudi Commission for Health Specialties Infectious Diseases Fellowship Program includes a three-month rotation in research during the third year. The following are the general guiding rules for these months, including their prerequisites, activities, and requirement for completion. Fellows are encouraged to engage and participate in research activities as early as possible. They are advised to identify a mentor from among the faculty members and participate in ongoing research to be acquainted with the procedures and steps.

Objectives

Acquire basic skills and knowledge in clinical research and concepts behind quantitative methods. After completing this rotation, fellows should have the ability to generate basic and clinical research questions, and then decide the best research methodologies to address it. They should be able to compose a research proposal detailing the background to the research question, the aim of the project, and the methods intended. Fellows must have completed the second year successfully to have a proposal approved by the hospital Institution Review Board (IRB).

Prerequisites and Activities

By the middle of the Program (end of month 18), fellows should submit to the Program Director the first draft of the research proposal. However, they should have previously started consultations and discussions with the Program Director or one of the faculty members who would become the mentor/co-investigator. The activities during the three-month rotation shall be planned and agreed upon between the fellow and the program director. Activities may include data collection/generation, data management/analysis, and preparation for presentation/publications. Fellows maybe entitled to fellowship extension for research purposes, depending on the type of their projects. During the three months, fellows are expected to participate in night and weekend calls, attend the once weekly sign-out rounds, and cover one clinic per week, unless exempted by the Program Director for research activity outside the healthcare facility. Fellows are encouraged to attend research courses, present abstracts at research meetings, and attend conferences.

Completion

Fellows are considered to have completed the rotation successfully if they present a proposal approved by the IRB and the Program Director or when mentors complete the evaluation form for the period.

TEACHING AND LEARNING ACTIVITIES

The teaching and learning objectives from several teaching activities include the following:

a. Case Presentation

The case presentation is conducted weekly by the assigned fellows under the supervision of ID consultants. The presented cases are those with interesting findings, unusual presentation, difficult diagnosis, or management. The objectives of the case presentation are as follows:

- To present a history and physical examination with details pertinent to infectious diseases
- Develop a proper differential diagnosis pertinent to infectious diseases
- Formulate a diagnosis/treatment plan for each problem
- Present a follow up on a patient's case in a focused, problem-based manner that includes pertinent new findings as well as diagnostic and treatment plans

b. Journal Clubs, Critical Appraisal, and Evidence-Based Medicine

A journal club meeting is conducted at least once every four weeks. The chief fellow or program director will choose a new article from a reputed journal and forward it to one of the fellows at least two weeks before the scheduled meeting. The objectives of the journal club meeting are as follows:

- Promote continuous professional development
- Keep fellows up-to-date with the literature related to infectious diseases
- Disseminate information on and stir debate on good practice
- Ensure that professional practice is evidence based
- Learn and practice critical appraisal skills
- Provide an enjoyable educational and social occasion

c. Plate round

Plate round is a joint meeting with the microbiology department conducted once monthly. The objectives of the plate round are as follows:

- Provide the knowledge, technical skills, and experience necessary for ID fellows to interpret and correlate microbiology findings
- Promote effective communication with microbiology service
- Promote the development of investigative skills to promote better understanding of pathologic processes as they apply to both individual patients and the general patient population
- Promote the acquisition of knowledge and provide experience in microbiology laboratory direction and management

Academic Half-Day Activities

The academic half-day consists of several types of sessions scheduled by the chief fellow and program director based on fellows' feedback from previous years, including the following:

- Immunology
- Microbiology
- Infection control
- Opportunistic infections

- Emerging pathogens
- HIV
    - Research and evidence-based practice

It is protected teaching time and mandatory for all fellows. It will be conducted on a monthly basis.

Self-Directed Learning

- Achieving personal learning goals beyond the essential, core curriculum
- Maintenance of personal portfolio (self-assessment, reflective learning, personal development plan)
- Audit and research projects
- Reading journals
- Attendance to training programs organized on a regional basis (symposia, conferences, board reviews, etc.)
- E-learning universal topics:

The Saudi Commission for Health Specialties intends to develop an e-learning platform for high value, interdisciplinary topics of utmost importance to trainees. The topics are delivered centrally to ensure that every trainee receives high-quality teaching and develops essential core knowledge. These topics are common to all specialties and will be delivered in a modular fashion. An online formative assessment is conducted at the end of each learning unit. After completion of all topics, there will be a combined summative assessment in the form of context-rich multiple-choice questions. All trainees must attain minimum competency in the summative assessment.

The following are mandatory modules to be completed at each fellow's level:

1. **F1: modules 1**
2. **F2: modules 7**

F1: Module 1: Introduction

1. Safe drug prescription
2. Hospital-acquired infections
3. Sepsis, systemic inflammatory response syndrome (SIRS), disseminated intravascular coagulation (DIC)
4. Antibiotic stewardship

Safe drug prescription

At the end of the learning unit, fellows should be able to:

a) Recognize the importance of safe drug prescription 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 drug prescription in special situations, such as renal and liver failure
e) Apply principles of drug prescription in elderly, pediatrics-age, and pregnant and lactating patients
f) Promote evidence-based cost-effective drug prescription
g) Discuss the ethical and legal framework governing safe-drug prescription in KSA

Hospital-Acquired Infections

At the end of the learning unit, fellows should be able to:

a) Discuss the epidemiology of hospital-acquired infections in KSA
b) Recognize hospital-acquired infections as one of the major emerging threats in healthcare
c) Identify the common sources and set-ups of hospital-acquired infections
d) Describe the risk factors of common hospital-acquired infections, such as ventilator-associated pneumonia, methicillin-resistant Staphylococcus aureus (MRSA), central line-associated bloodstream infection, Vancomycin-resistant Enterococcus
e) Identify the role of healthcare workers in the prevention of hospital-acquired infections
f) Determine appropriate pharmacological (e.g., selected antibiotics) and non-pharmacological (e.g., removal of indwelling catheter) measures in the treatment of hospital-acquired infections
g) Propose a plan to prevent hospital-acquired infections in the workplace

Sepsis, SIRS, DIC

At the end of the learning unit, fellows should be able to:

a) Explain the pathogenesis of sepsis, SIRS, and DIC
b) Identify patient- and non-patient-related predisposition factors for sepsis, SIRS, and DIC
c) Recognize a patient at risk of developing sepsis, SIRS, and DIC
d) Describe the complications of sepsis, SIRS, and DIC
e) Apply the principles of management of patients with sepsis, SIRS, and DIC
f) Describe the prognosis of sepsis, SIRS, and DIC

Antibiotic Stewardship

At the end of the learning unit, fellows should be able to :

a) Recognize antibiotic resistance as one of the most pressing public health threats globally
b) Describe the mechanism of antibiotic resistance
c) Determine the appropriate and inappropriate use of antibiotics

d) Develop a plan for safe and proper antibiotic usage, including proper indications, duration, types of antibiotic, and discontinuation.
e) Appraise the local guidelines in the prevention of antibiotic resistance

F2: Modules 7: Ethics and Healthcare

5. Occupational hazards of healthcare workers
6. Evidence-based approach to smoking cessation
7. Patient advocacy
8. Ethical issues: transplantation/organ harvesting, withdrawal of care
9. Ethical issues: treatment refusal, patient autonomy
10. Role of doctors in death and dying

Occupation Hazards of Healthcare Workers

At the end of the learning unit, fellows should be able to:

a) Recognize common sources and risk factors of occupational hazards among healthcare workers
b) Describe common occupational hazards in the workplace
c) Develop familiarity with legal and regulatory frameworks governing occupational hazards among healthcare workers
d) Develop a proactive attitude to promote workplace safety
e) Protect yourself and colleagues against potential occupational hazards in the workplace

Evidence-Based Approach to Smoking Cessation

At the end of the learning unit, fellows should be able to:

a) Describe the epidemiology of smoking and tobacco usage in KSA
b) Review the effects of smoking on the smoker and his/her family members
c) Effectively use pharmacologic and non-pharmacologic measures to treat tobacco usage and dependence
d) Effectively use pharmacologic and non-pharmacologic measures to treat tobacco usage and dependence among special population groups, such as pregnant ladies, adolescents, and patients with psychiatric disorders

Patient Advocacy

At the end of the learning unit, fellows 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 patients
d) Develop a positive attitude toward patient advocacy
e) Be a patient advocate in conflicting situations
f) Be familiar with local and national patient advocacy groups

Ethical issues: transplantation/organ harvesting, withdrawal of care

At the end of the learning unit, fellows should be able to:

a) Apply key ethical and religious principles governing organ transplantation and withdrawal of care
b) Be familiar with the legal and regulatory guidelines regarding organ transplantation and withdrawal of care
c) Counsel patients and families in light of applicable ethical and religious principles
d) Guide patients and families to make informed decisions

Ethical issues: treatment refusal, patient autonomy

At the end of the learning unit, fellows should be able to:

a) Predict situations where 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 with consideration for the best interest of patients

Role of Doctors in Death and Dying

At the end of the learning unit, fellows 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 his/her family
c) Provide appropriate pain management in a dying patient
d) Identify suitable patients and refer them to palliative care services

Assessment of the academic activities

a) Resident will be asked to complete an evaluation form (see below)
b) These evaluation forms will be reviewed generically by the curriculum committee yearly to advice for changes in the curriculum
c) Presenters in different academic activities will be evaluated by the supervising staff (see presenter evaluation) to help the presenters improve their presentation in the future

TABLE OF TEACHING AND LEARNING ACTIVITIES LINKED TO CanMEDS

ACTIVITY	OBJECTIVES	CanMED COMPETENCIES	COMMENTS
DIDACTIC CENTRALIZED COMPONENT OF THE CURRICULUM			
Case Presentation	• Be able to present ID-related history and physical examination with details pertinent to a patient's problem • Create a list of all problems identified in the history and physical examination • Develop a proper differential diagnosis for each problem • Formulate a diagnosis/treatment plan for each problem • Present a follow up on a patient's case in a focused and problem-based manner, including pertinent new findings and diagnoses and treatment plans • Demonstrate a commitment to improving case presentation skills by regularly seeking feedback on presentations • Fellows should accurately and objectively record and present data.	• Medical Expert • Scholar	Records of proceedings are kept confidential
Journal Clubs	• Promoting a continuing professional development • Keeping up-to-date with the literature • Disseminating information and stirring debate on good practice • Ensuring that professional practice is evidence based • Learning and practicing critical appraisal skills • Providing an enjoyable educational and social occasion	• Medical Expert • Scholar • Health Advocate	The presenter is a fellow under a senior staff supervisor.
Plate Round	• Provide the knowledge, technical skills, and experience necessary for ID fellows to interpret and correlate clinical findings and laboratory data such as microbiological findings • Promote effective communication and sharing of expertise with peers and colleagues	• Medical Expert • Communicator • Collaborator • Manager	Fellows will present a brief history followed by a discussion with senior staff from other disciplines.

ACTIVITY	OBJECTIVES	CanMED COMPETENCIES	COMMENTS
DIDACTIC CENTRALIZED COMPONENT OF THE CURRICULUM			
	• Promote the development of investigative skills to better understand pathologic processes as they apply to both individual patients and the general patient population • Promote the acquisition of knowledge, provide experience in laboratory direction and management, and encourage residents to assume a leadership role in the education of other physicians and allied health professionals		
Self-Directed Learning	• Achieve personal learning goals beyond the essential and core curriculum • Maintain a personal portfolio (self-assessment, reflective learning, personal development plan) • Audit and research projects • Read journals • Attend training programs organized on a regional basis (Symposia, Conferences, Board review, etc.). • E-learning of universal topics (modules)	• Medical Expert • Scholar • Manager • Professional	See below the recommended e-learning modules, books, journals, and other materials

TABLE 1: SUGGESTED TOPICS TO BE PRESENTED IN THE ACADEMIC HALF DAY

TOPICS	
Febrile patient with a rash	At the end of these lectures, fellows are expected to master the ability to recognize, diagnose, treat, and manage complications associated with the following infectious diseases and to demonstrate an understanding of the following specific topics.
Pleuropulmonary and bronchial infections	
Urinary tract infections	
Peritonitis and other intra-abdominal infections	
Cardiovascular infections	
Central nervous system infections	
Skin and soft tissues infections	
Infections related to trauma and bites	
Infections in burned patients	
Infections in patients on chronic renal dialysis	
Gastrointestinal infections	
Bone and joint infections, including chronic osteomyelitis	
Infections of the reproductive organs, including obstetrical infections	
Neurological and neurosurgical infectious complications	
Eye infections	
Viral hepatitides	**To learn the comprehensive multidisciplinary approach to ambulatory care of HIV-infected adults and adolescents including:** • Initial medical evaluation and staging of HIV disease • Monitoring of HIV disease outcomes and antiretroviral therapy • Initiation and follow-up of antiretroviral therapy • Management of the antiretroviral treatment experienced by patients, including the use and interpretation of drug resistance assays and new antiretroviral drugs • Opportunistic infection prophylaxis and treatment • Management of antiretroviral toxicity and complications, including metabolic complications and mitochondrial toxicities • Understanding major drug interactions involving antiretroviral agents and other drugs
Sepsis syndromes	
Healthcare associated infections	
Tuberculosis	
Infections in solid organ transplant recipients	
Sexually transmitted infections	
Mechanisms of action and adverse reactions to antimicrobial agents	
Epidemiology and pathogenesis of major viral, bacterial, mycobacterial, fungal, and parasitic diseases, and their clinical manifestations and treatment	
HIV-related opportunistic infections	
Serious complications and toxicities associated with antiretroviral therapy	

Outpatient Clinic-Based Learning

ID fellows will be assigned to one clinic per week from 8:30 am to 12:00 pm. Clinic duty primarily consists of outpatient follow-up visits on patients previously hospitalized, management of patients on home IV antibiotic, and management of HIV-infected persons. In addition, new consultations are seen in these clinics. Fellows will attend approximately 50 outpatient clinics per year. The average number of patients examined per clinic will be 6, including one new patient visit, resulting in approximately 300 patient visits per year or 600 visits in two years. The fellows have primary responsibility for the ambulatory care of Infectious Diseases Clinic patients and hospital follow-up visits. They are always supervised by an attending ID physician who will review the care and sign off on each patient visit. Subspecialty residents will make the majority of decisions, with difficult decisions made in consultation with the attending physician. Continuity of care is provided by arranging for ID fellows to maintain an outpatient clinic for the follow up of patients previously evaluated and treated through the inpatient service. This outpatient clinic is maintained throughout the fellowship training. This experience includes the continuous management of patients with all stages of HIV infection over a 24-month period.

ASSESSMENT

Description: Evaluation and assessment of fellows throughout the program are undertaken in accordance with the Commission's training and examination rules and regulations. This includes the following:

Annual Assessment

Continuous Appraisal

This assessment is conducted toward the end of each training rotation throughout the academic year and at the end of each academic year as a continuous means of both formative and summative evaluation.

Continuous formative evaluation

To fulfill the CanMEDS competencies based on the end-of-rotation evaluation, the fellow's performance will be evaluated jointly by relevant staff members who will assess the following competencies:

1. Performance of the trainee during daily work.
2. Performance and participation in academic activities (see the "Evaluation of the presenter by staff supervisor" form below).
3. Performance in 10 to 20 minutes of directly observed trainee–patient interaction. Trainers are encouraged to perform at least one assessment per clinical rotation, preferably near the end of the rotation. Trainers should provide timely and specific feedback to the trainee following each assessment of trainee–patient encounters (Mini Clinical Evaluation Exercise [Mini-CEX] and case-based discussions).
4. Trainee's performance of diagnostic and therapeutic procedural skills. Timely and specific feedback from the trainer to the trainee is mandatory following each procedure (direct observation of procedural skills).
5. The CanMEDS-based competencies end-of-rotation evaluation form must be completed (preferably in electronic format), with the signatures by the attending consultants, within two weeks of the end of each rotation. The program director discusses evaluations with fellows as necessary. The evaluation form is submitted to the SCFHS Regional Training Supervisory Committee within four weeks of the end of the rotation.
6. Academic and clinical assignments should be documented on an electronic tracking system (e-Logbook, when applicable) on an annual basis (Appendix 1). Evaluations are based on accomplishment of the minimum requirements for the procedures and clinical skills, as determined by the program.

Summative continuous evaluation:

A summative continuous evaluation report is prepared for each fellow at the end of each academic year and may also involve clinical or oral examinations, an objective structured practical examination, or an objective structured clinical examination.

End-of-first-year examination:
The end-of-year examination will be limited to F1 fellows. The number of examination items, eligibility, and passing score are established in accordance with the Commission's training and examination rules and regulations. Examination details and a blueprint are published on the Commission website, www.scfhs.org.sa

Final In-training Evaluation Report (FITER)/Comprehensive Competency Report (CCR)

In addition to the local supervising committee's approval of the completion of the clinical requirements (via the fellow's logbook), the program directors prepare a FITER for each fellow at the end of the final year of fellowship (F2). This could also involve clinical or oral examinations or completion of other academic assignments.

Final Adult Infectious Disease Saudi Fellowship Examination

The final Saudi Fellowship examination consists of two parts:

1. **Written Examination**
   This examination assesses the trainee's theoretical knowledge base (including recent advances) and problem-solving capabilities in the adult infectious disease specialty; it is delivered in MCQ format and is held at least once per year. The number of examination items, eligibility, and passing score are established in accordance with the Commission's training, and examination rules and regulations. Examination details and a blueprint are published on the Commission's website, www.scfhs.org.sa

2. **Oral Structure Clinical Examination (OSCE):**
   This examination assesses a broad range of high-level clinical skills, including data gathering, patient management, communication, and counseling. The examination is held at least once per year, as an objective structured clinical examination (OSCE) in the form of patient management problems (PMPs). Eligibility and the passing score are established in accordance with the Commission's training and examination rules and regulations. Examination details and a blueprint are published on the Commission website, www.scfhs.org.sa

Certification

A certificate acknowledging training completion will only be issued to the fellow upon successful fulfillment of all program requirements. Candidates passing all components of the final specialty examination are awarded the "**Saudi Fellowship of Adult Infectious Disease**" certificate.

APPENDIX

End Of Rotation Evaluation

Criteria	1	2	3	4	5
Knowledge and Assignments	No knowledge to understand the activity	Limited knowledge to understand the activity at an overview level, or not in-depth	Adequate knowledge of most of the activities The trainee had a thorough understanding of the activity. The trainee had exceptionally grounded knowledge to understand all aspects of the activity.	Has a thorough understanding of the activity The trainee had exceptionally grounded knowledge to understand all	Has exceptionally grounded knowledge to understand all aspects of the activity
History Taking and Physical Examination	Demonstrates poor knowledge in history taking and physical examination skills	Sometimes demonstrates poor knowledge in history taking and physical examination skills	Demonstrates satisfactory knowledge in history taking and physical examination skills	Demonstrates very good knowledge in history taking and physical examination skills	Demonstrates exceptional knowledge in history taking and physical examination skills
Data Interpretations and Utilization of Information (Clinical Diagnosis)	Major concern in the ability to interpret investigation tools as well as analyze and integrate all relevant data	Minor concern in the ability to interpret investigation tools as well as analyze and integrate all relevant data	No concern in the ability to interpret investigation tools as well as analyze and integrate all relevant data	Impressive ability to interpret investigation tools as well as analyze and integrate all relevant data	Outstanding ability to interpret investigation tools as well as analyze and integrate all relevant data
Management Plan and Decision Making	Major concern in decision making, direct supervision, and management	Minor concern in decision making, direct supervision, and management	No concern in decision making, direct supervision, and management	Impressive in decision making, direct supervision, and management	Outstanding in decision making, direct supervision, and management
Completeness of Charts and Reports	Not able to complete charts and reports satisfactorily	Has completed certain aspects of the activity adequately with expert support	Has completed certain aspects of the activity adequately with minimal expert support	Has completed all aspects of the activity very well	Has completed all aspects of the activity exceptionally
Communication Skills	Major concern in the ability to communicate effectively with patients, families, and health care providers	Minor concern in the ability to communicate effectively with patients, families, and health care providers	No concern in the ability to communicate effectively with patients, families, and healthcare providers	Impressive ability to communicate effectively with patients, families, and health care providers	Outstanding ability to communicate effectively with patients, families, and health care providers
Attitude and Ethics	Unsatisfactory attitude and not following the legal and ethical codes	Poor attitude to patients, colleagues, and superiors	Satisfactory attitude and he/she asked for help when needed	Very good attitude and he/she followed the legal and ethical codes	Exceptional and professional attitude
Attendance and Punctuality	Unsatisfactory attendance	Poor attendance	Satisfactory attendance	Very good attendance	Punctual when reporting to duty
Relationship with Others	**Rude, not willing to collaborate or help others**	Rude but does not mind collaborating or helping others	**Nice but not cooperative**	**Cooperative but tough**	Very pleasant and cooperative

Continuous Evaluation (Rotation)

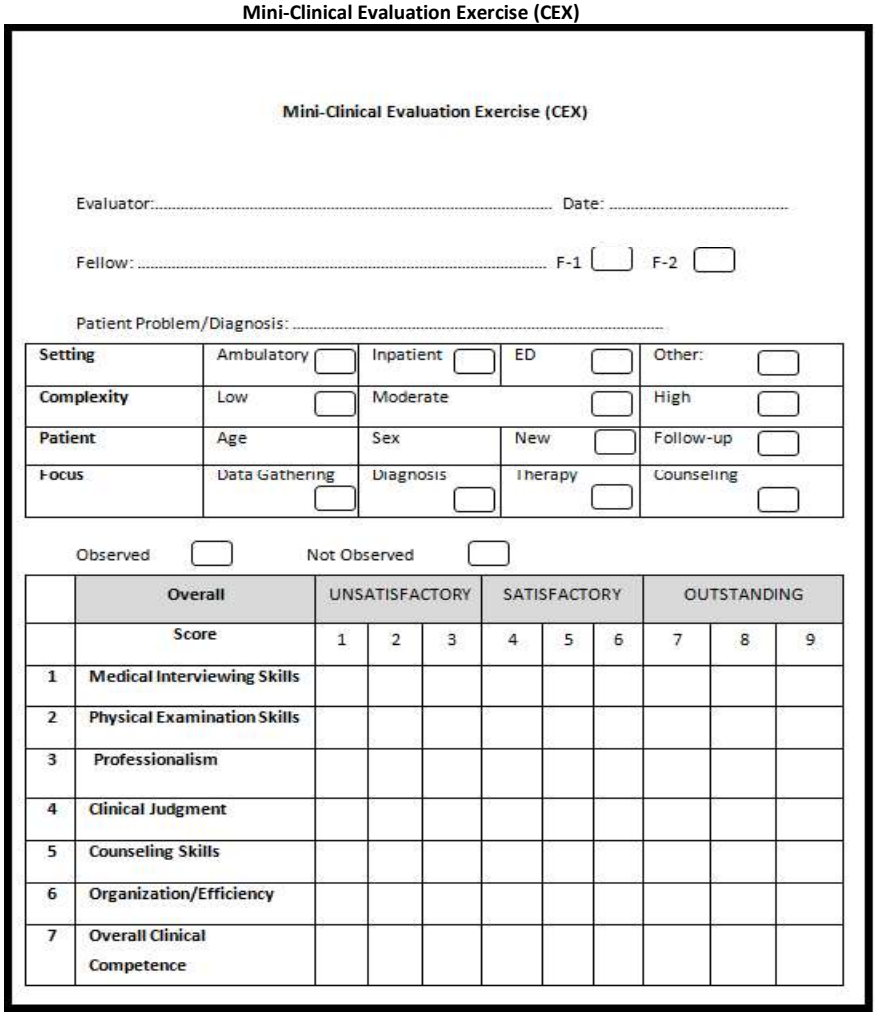
Criteria	1	2	3	4	5
Communication Skills	Major concern in the ability to communicate effectively with patients, families, and health care providers	Minor concern in the ability to communicate effectively with patients, families, and health care providers	No concern in the ability to communicate effectively with patients, families, and health care providers	Impressive ability to communicate effectively with patients, families, and health care providers	Outstanding ability to communicate effectively with patients, families, and health care providers
Collaboration	Cannot participate effectively and appropriately in an inter-professional health care team	Needs to improve ability to participate effectively and appropriately in an inter-professional health care team	Participates effectively and appropriately in an inter-professional health care team	Impressive and very effective in an inter-professional health care team	Outstanding team member
Attitude and Ethics	Not following the legal and ethical codes	Poor attitude to patients, colleagues, and superiors	Satisfactory attitude and he/she asked for help when needed	Very good attitude and he/she followed the legal and ethical codes	Exceptional and professional attitude
Attendance and Punctuality	Unsatisfactory attendance	Poor attendance	Satisfactory attendance	Very good attendance	Punctual when reporting to duty
Department Participation	No participation	Few questions and rarely participates	Few questions and often participates	Discusses the case and has good participation	Detailed discussion and contributes through active participation
Relation to Others	Rude, not willing to collaborate or help others	Rude but does not mind collaborating or helping others	Nice but not cooperative	Cooperative but tough	Very pleasant and cooperative

Professionalism (Program Director/Mentor Evaluation)

Mini-Clinical Evaluation Exercise (CEX)

- Customized mini-CEX for most important conditions of the specialty
- Mini-CEX and DOPS will be an open and joint exercise between the trainee and supervisor
- Should have a very high emphasis on formative development
- At least 15 minutes should be dedicated to feedback

Mini-Clinical Evaluation Exercise (CEX)



Mini-Clinical Evaluation Exercise (CEX)

Evaluator:..... Date: .....

Fellow: ..... F-1 ☐ F-2 ☐

Patient Problem/Diagnosis: .....

Setting	Ambulatory ☐	Inpatient ☐	ED ☐	Other: ☐
Complexity	Low ☐	Moderate ☐		High ☐
Patient	Age	Sex	New ☐	Follow-up ☐
Focus	Data Gathering ☐	Diagnosis ☐	Therapy ☐	Counseling ☐

Observed ☐ Not Observed ☐

	Overall	UNSATISFACTORY			SATISFACTORY			OUTSTANDING		
	Score	1	2	3	4	5	6	7	8	9
1	**Medical Interviewing Skills**									
2	**Physical Examination Skills**									
3	**Professionalism**									
4	**Clinical Judgment**									
5	**Counseling Skills**									
6	**Organization/Efficiency**									
7	**Overall Clinical Competence**									

Mini-CEX Time: Observing ..... Min Providing Feedback: ..... Min

Evaluator Satisfaction with Mini-CEX:
LOW 1 2 3 4 5 6 7 8 9 HIGH

Resident Satisfaction with Mini-CEX:
LOW 1 2 3 4 5 6 7 8 9 HIGH

Comments:

Resident Signature.....**Evaluator Signature**.....

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; 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; modest
3- **Professionalism:** Shows respect, compassion, empathy; establishes trust; attends to patients' needs of comfort, modesty, confidentiality, information
4- **Clinical Judgment:** Selectively orders/performs appropriate diagnostic studies; considers risks, benefits
5- **Counseling Skills:** Explains the rationale for a test/treatment; obtains patients' consent; educates/counsels regarding proper management
6- **Organization/Efficiency:** Prioritizes; is timely and succinct
7- **Overall Clinical Competence:** Demonstrates good judgment, synthesis, caring, effectiveness, and efficiency

Clinical Evaluation Exercise (Mini-CEX)(Instructions For Fellows)

The Clinical Evaluation Exercise (mini-CEX) assesses clinical skills, attitudes, and behaviors in the clinical care setting.

How the mini-CEX works

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

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.

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 GP trainee or specialty trainee at a similar stage in training.

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.

When taking the mini-CEX
Fellows are expected to undertake four to six observed encounters in each training year.

- Frank JR, Snell L, Sherbino J, editors. CanMEDS 2015 Physician Competency Framework. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015.).