



الهيئة السعودية للتخصصات الصحية  
Saudi Commission for Health Specialties

# Body Imaging Fellowship Curriculum 2020



سِرِّهِمْ وَمَنْ يَخْفَى

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# INTRODUCTION

## 1. Context of Practice

The Body Imaging Fellowship is a two-year appointment to a joint fellowship program at the centers accredited by the Saudi Commission for Health Specialties (SCFHS).

Body imaging is one of the broadest areas in radiological sciences. The diversity of clinical disciplines served by this subspecialty area is a testament to this fact. Disciplines such as gastroenterology, general surgery, urology, gynecology, oncology, nephrology, endocrinology, transplant surgery, and vascular surgery all interact extensively with radiologists who perform imaging examinations in this area.

This diversity underscores the need for highly trained body imaging specialists capable of answering the often complex clinical questions posed during the management of patients being treated within these clinical disciplines. This program aims to take a major step toward fulfilling this goal.

The Saudi Body Imaging Fellowship Training Program is a joint fellowship program in which candidates rotate in different SCFHS accredited centers, gaining as much exposure as possible to different types of patients with GI/GU diseases as well as to operational systems and health care providers, in order to enrich the trainees' experience in the field of body imaging. The program has adopted the implementation of the CanMEDs rules and goals as per the vision and mission of SCFHS for all training programs in the Kingdom, which will be explained in detail below.

### Past, present, and future

The Saudi Certification Board of the Body Imaging Fellowship was founded in 2013 with four candidates in the program in the Riyadh region. As of 2017, the number of candidates enrolled in the program, including first and second-year fellows, rose to 12 trainees distributed in Riyadh tertiary and teaching hospitals. The plan is to increase the number of candidates to 20 and that of the training centers to include the eastern and western regions to match the national needs, according to the 2030 vision and as per the rules and regulations of SCFHS. Graduates from this program in addition to Saudi citizens include nationals from the Gulf Cooperation Council (GCC) and other Arab countries.

## 2. Goal and responsibility of curriculum implementation

The goal of the Body Image Fellowship Program Curriculum is to guide trainees to become competent in their specialty, which will require a significant amount of effort and coordination from all stakeholders involved in postgraduate training. As an "adult-learner," the trainee must demonstrate proactive and full engagement by careful understanding of learning objectives, self-directed learning, problem solving, openness, readiness to apply what they have learned by reflective practice from feedback and formative assessment, self-wellbeing, and seeking support when needed.

The Program Director has a vital role in making the implementation of this curriculum most successful, and training committee members, particularly the Program Administrator and Chief Resident, have a significant impact on the program's implementation. Trainees should be able to share responsibility in curriculum implementation, and the SCFHS will apply the best models of training governance to achieve the best quality of training. Academic affairs in training centers and the regional supervisory training committee will also have a major role in training supervision and implementation. The body image scientific committee will be responsible for ensuring that the content of this curriculum is constantly updated to match the best-known standards in the postgraduate education of their specialty.

The main goal of the Body Image Fellowship Program is to provide high-level training and ensure subspecialty competency in all aspects of adult body imaging, thereby enabling graduates to function as local and national references in the diagnosis and radiological evaluation of pathological processes in the adult abdomen and pelvis.

The graduates are expected to be experts and valuable resources in the field of advanced subspecialty

multidisciplinary medical care and education with:

- In-depth understanding of the major imaging techniques relevant to body imaging, including MRI, CT, fluoroscopy, sonography, and nonvascular body interventional procedures;
- Clinical knowledge relevant to the medical and surgical management of the diseases so that they can confidently discuss the appropriate imaging strategy for the clinical problem with the referring clinician;
- Detailed knowledge of current developments in the specialty;
- Direct practical exposure with appropriate graded supervision in all forms of current imaging procedures;
- Appropriate competency and accuracy in the selection, performance, supervision, and reporting of body imaging procedures.
- Understanding and practice of appropriate Islamic medical ethics and assuming an acceptable professional conduct that should be applied throughout their subsequent medical career;
- Solid knowledge about different types of radiographic and MR contrast media;
- Understanding the indications, doses, concentrations, complications, and contraindications of various contrast media.
- Familiarizing themselves with the risk factors of contrast-induced nephropathy (CIN) and how to handle such cases as well as the risk factors of nephrogenic systemic fibrosis (NSF) and how to avoid such condition.
- Ability to conduct prophylaxis and initial management of moderate or severe contrast media reactions;
- Knowledge of the current standards and guidelines for use of iodinated and MR contrast media.

### Specific objectives

- Acquiring knowledge of relevant embryological, anatomical, pathophysiological, biochemical, and clinical aspects of gastrointestinal and genitourinary (GI/GU) diseases.
- Obtaining in-depth understanding of the major imaging techniques relevant to GI/GU diseases.
- Listing the indications, contraindications, complications, and limitations of surgical, medical, and radiological interventions and procedures pertaining to the GI/GU systems.
- Applying the clinical knowledge relevant to medical and surgical GI/GU diseases so that the fellow may confidently discuss the appropriate imaging strategy for the clinical problem with the referring clinician.
- Learning and understating the detailed knowledge of current developments and updates in the specialty.
- Acquiring direct practical exposure with appropriate graded supervision in all forms of current GI/GU imaging procedures.
- Acquiring appropriate competency and accuracy in the selection, performance, supervision, and reporting of GI/GU imaging investigations and minor imaging-guided interventions.
- Recognizing and practicing appropriate Islamic medical ethics and assuming an acceptable professional conduct that shall be applied throughout the fellow's subsequent medical career.

### 3. What is new in this edition?

This curriculum replaces the previous version of the Body Imaging Fellowship Program Curriculum from 2013 to ensure that it meets the updated rules of SCFHS and the Canadian Medical Education Directions for Specialists (CanMEDs) framework.

This version of the Body Imaging Fellowship Program Curriculum follows the competency-based framework adopted by the SCFHS. In addition, the following changes have been included in this version:

1. All rotations in the fellowship program as well as educational activities are described in a competency-based format with clear objectives, according to CanMEDs body imaging: medical expert, communicator, collaborator, manager, health advocate, scholar, and professional.
2. The block rotation is adapted to make it compatible with the block rotations used in all hospitals.
3. The methods of assessment for every rotation have been revised.



4. Assessment tools: (A) the structured oral examination (SOE), (B) the objective structured clinical examination (OSCE), and (C) the academic activities task have been approved for evaluation and promotion to the next level in training.
5. New regulations regarding attendance and punctuality have been added.
6. A new section about mentoring has been added.

#### 4. Abbreviations Used in This Document:

##### Abbreviations table

CT	Computed Tomography
F1	Fellow year one
F2	Fellow year two
GI	Gastroenterology
GU	Genitourinary
LIRAD	Liver Imaging-Reporting and Data System
MRI	Magnetic Resonance Imaging
PI-RAD	Prostate Imaging-Reporting and Data System
TI-RAD	Thyroid Imaging-Reporting and Data System
US	Ultrasound



# PROGRAM STRUCTURE

## 1. Program Entry Requirements

To be accepted in the Body Imaging Fellowship Program, a candidate must:

1. Possess a Saudi Specialty Certificate in Radiology or its equivalent (which is approved by the Saudi Commission) or have at least successfully completed the written component of the Saudi Specialty Certificate in Radiology.
2. Be licensed to practice medicine in Saudi Arabia.
3. Provide written permission from the sponsoring institution, allowing them to participate in full-time training for the entire two-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 for this subspecialty.
6. Provide three letters of recommendation from consultants with whom the candidate has recently worked.
7. Register as a trainee at the SCFHS.

## 2. Program Duration & Rotations:

This is a two-year (26 blocks\*) fellowship program that will conform to the following structure:

Rotation	F1	F2
US	2	2
CT	4	3
MRI	4	4
FL	1	
IR	1	
Elective	1	1
Research	1	
Vacations	1	1
Total	26	

- Each block represents four weeks



# LEARNING AND COMPETENCIES

## 1. Introduction to Learning Outcomes and Competency-Based Education

In the Body Imaging Fellowship Program, training is guided by well-defined “*learning objectives*” that are driven by targeted “*learning outcomes*” to serve the specific needs of the program. Learning outcomes are supposed to reflect the professional “*competencies*” and tasks that are “*entrusted*” to trainees upon graduation to ensure that they will meet the expected demands of the healthcare system and patient care in relation. *Competency-based education* (CBE) is an approach of “*adult-learning*” that is based on achieving *pre-defined, fine-grained, and well-paced* learning objectives that are driven from complex professional competencies. Professional competencies related to healthcare are usually complex and contain a mixture of multiple learning domains (knowledge, skills, and attitude). CBE is expected to change the traditional way of postgraduate education; for instance, time of training, though a precious resource, should not be looked to as a proxy for *competence* (e.g., time of rotation in certain hospital areas is not the primary marker of competence achievement). Furthermore, CBE emphasizes the critical role of the informed judgment of learners’ competency progress, which is based on a staged and formative assessment that is driven from multiple workplace-based observations. Trainees are expected to progress from novice to mastery level in certain set of professional competencies. SCFHS has endorsed the CanMEDs to articulate professional competencies. CanMEDS represents a globally accepted framework outlining competency roles. The CanMEDs 2015 Framework has been adopted in the Body Imaging Fellowship Program.

This reference describes the general outline of the CanMED competency (Frank JR, Snell L, Sherbino J, editors. CanMEDS 2015 Physician Competency Framework. Ottawa: Royal College of Physicians and Surgeons of Canada; 2015) which covers the seven roles of CanMEDs competencies: medical expert, communicator, collaborator, manager, health advocate, scholar, and professional.

## 2. Specific (rotation based) competencies

### CT Body Rotation

Number of rotation blocks	F1	F2	Total
	4	3	7

#### Fellow’s knowledge

- To describe detailed and complex CT radiological anatomy.
- To explain the advanced physical principles behind radiological techniques (iterative reconstruction versus filtered back projection).
- To explain advanced imaging techniques and problem-solving solutions (dual energy imaging techniques).
- To recognize the unusual imaging presentations of common pathologies.
- To demonstrate a strong fund of differential diagnostic possibilities for abdominal CT imaging findings.
- To recognize and recommend the most appropriate next step in patient management.

#### Fellow Skills

- To generate appropriate opinions about complex imaging findings.
- To perform common post-processing tasks for abdominal imaging studies, including multiplanar reformations (MPR), maximum intensity projections (MIP), minimum intensity projections (MinIP), and vessel analysis.
- To be able to process dual energy CT images from workstations (e.g., renal stone analysis, increased conspicuity of hepatic lesions, iodine contrast removal).
- To use and practice basic imaging informatics skills (e.g., fetching and transferring images to and from advanced visualization systems).



## General Diagnostic Ultrasound

Number of rotation blocks	F1	F2	Total
	2	2	4

### Fellow's Knowledge

- To expand their knowledge of the physics of ultrasound to include:
  - Physics of duplex and color Doppler
  - Basic Doppler spectral analysis
  - Methods of quality control
- To list and describe the advantages and limitations of percutaneous fine needle aspiration biopsy.
- To identify the basics of obstetrical imaging such as obstetrical complications and common fetal anomalies.

### Fellow's Skills

- To be able to perform small parts scans (thyroid, testicles) and transvaginal and transrectal sonography in addition to routine imaging.
- To be able to perform some basic duplex Doppler studies (e.g., Doppler venous studies, upper, carotid, and renal arteries) as well as transplanted organ assessments, like the liver and kidney.
- To attend and participate in ultrasound-guided biopsies as delegated by the supervising radiologist once the expected level of scanning has been attained (this may instead be accomplished during interventional rotations.)
- To demonstrate the ability to manage the patient independently during a procedure performed in close association with a specialist or other physician who has referred the patient. The fellow should know when the patient's best interests are served by discontinuing a procedure or referring the patient to another physician.

### \*Organs and topics to be covered in this rotation:

#### NECK

- Thyroid: size, shape, multinodular goiter, benign/malignant neoplasm, associated adenopathy, localization of parathyroid mass, biopsy of thyroid/parathyroid mass or adenopathy.
- Vascular exams: carotid duplex exam (with Doppler spectrum analysis) including normal appearance, arterial occlusion, stenosis, plaque, subclavian steal, and jugular thrombosis.

#### ABDOMEN

- Liver: size, shape, echo texture, Doppler and color imaging of hepatic arteries, veins, and portal veins, diffuse disease, focal mass (cyst, hemangioma, hepatocellular carcinoma, metastatic lesions), cirrhosis/portal hypertension, varices, transplant evaluation, intrahepatic porto-systemic shunt Doppler evaluation.
- Gallbladder/Bile Ducts: size of gallbladder, intra- and extra-hepatic duct size, gallstones, acute cholecystitis (calculus/acalculous), hyperplastic cholecystosis, sludge, polyps, carcinoma, HIV-related biliary disease, biliary obstruction/dilatation, and duct stones .
- Pancreas: normal anatomy/size, duct size, acute/chronic pancreatitis, pseudocyst, calcifications, cysts, and masses (benign/malignant).
- Spleen: normal anatomy/size, focal lesions (cystic vs. solid), trauma, and splenic varices.
- Kidneys/Ureters: normal anatomy/size, cysts (simple/complex), cystic diseases, renal cell carcinoma, angiomyolipoma, hydronephrosis/hydroureter, calculi, abscess/pyelonephritis, perinephric fluid, renal arterial Doppler (including use of the resistive index), and renal transplant evaluation (include Doppler).
- Adrenal glands: focal lesion (cyst/solid).
  - Peritoneal cavity: localization/quantification/aspiration of fluid (free/loculated), including abscess, blood, omental mass, and free air.



- Gastrointestinal Tract: normal appearance, appendicitis, pyloric stenosis, intussusception, and mass.
- Retroperitoneum/Vessels: adenopathy, aorta (normal/aneurysm, including proximal and distal extent), and inferior vena cava (normal/thrombosis).
- Renal and hepatic transplant assessment (estimating resistive index) identifying strictures and collections.

## Fluoroscopy Rotation

Number of rotation blocks	F1	F2	Total
	1	0	1

*In addition to the general competencies addressed under General Objectives (competencies), the following competencies are also required for this rotation:*

## Medical Expert

### Fellow's Knowledge

- To explain the indications as well as absolute and relative contraindications of various fluoroscopic procedures and the relevant contrast media used.
- To describe when and how to use different types of contrast media (e.g., barium and high and low osmolar contrast).
- To differentiate between the different lines and tubes seen on radiographs and to learn how to detect their complications and misplacement.
- To explain the appropriate indications, views, and patient positioning for emergency radiographic studies.
- To list the most important differential diagnostic possibilities for relevant imaging findings.

### Fellow's Skills

- To appropriately perform advanced fluoroscopic techniques including barium swallow, barium meal, small bowel follow through, barium enema, fistulography, cholangiography, ascending urethrography, and micturating/voiding cystourethrography, and defecography.
- To be able to supervise technical staff in the appropriate performance of fluoroscopic studies.

## Nonvascular Intervention Radiology (IR) Rotation

Number of rotation blocks	F1	F2	Total
	0	1	1

## Medical Expert

### Fellow's Knowledge:

- To select what type of procedure is indicated for each disease or laboratory test.
- To describe the required tissue/fluid aspiration for diagnosis.
- To recognize each needle type, catheters, and guide wires, and their uses.



### Fellow's Skills:

- To identify the basic technique of fine needle aspiration.
- To learn and perform peritoneal and abscess aspiration/drainage under supervision.
- To learn and perform core biopsy under supervision.

### **Body Magnetic Resonance Imaging Rotation**

Number of rotation blocks	F1	F2	Total
	4	4	8

### **Medical Expert**

#### Fellow's Knowledge

- To recognize the detailed and complex radiological anatomy of abdominal and pelvic organs.
- To list the advanced physical principles and clinical use behind MRI sequences (spine echo, fast spin echo, echoplanar imaging, gradient sequence, motion-insensitive sequences such as single shot fast spin echo [SSFSE] and steady-state free precession [SSFP]).
- To describe the role and application of parallel imaging, spectroscopy, perfusion, diffusion, and elastography.
- To explain the utilization of organ specific contrast agents (in hepatic and vascular imaging).
- To identify patient preparation and image acquisition for dedicated MRI imaging techniques such as MR enterography, MR elastography, MR defecography, MR hepatic iron quantification, and MRI prostate.
- To recognize the unusual imaging presentations of common pathologies.
- To develop a strong fund of differential diagnostic possibilities for body MR imaging findings.
- To recognize the major differences, with pros and cons, of 1.5 versus 3 teslas.
- To recognize and recommend the most appropriate next step in patient management.

#### Fellow's Skills

- To generate appropriate opinions about complex imaging findings.
- To perform common post-processing tasks for abdominal MRI studies, including MPR, MIP, MinIP, and vessel analysis, in addition to processing apparent diffusion coefficient (ADC) maps from different b-values and producing perfusion maps (multiparametric prostate imaging).
- To acquire and practice basic imaging informatics skills (fetching and transferring images to and from advanced visualization systems).

### **3. Academic activities**

#### **3.1. General Principles**

Efforts should be directed to enhance trainees toward more responsibility for self-directed learning. The teaching should contain both:

- a) A structured-programmatic component, and
- b) A practice-based component.

The structured-programmatic component is mainly in the form of the academic half day during which teaching is conducted (*At least 2–4 hours of formal training time every week*). Formal teaching time is an activity planned in advanced with an assigned tutor, time slot, and venue, and it would include the following three formal teaching activities:

- i. Universal topics: 20–30%
- ii. Core specialty topics: 40–50%
- iii. Trainee selected topics: 20–30%



### 3.2. Formal training time should be supplemented by other practice-based learning (PBL) such as:

1. Morning report or case presentations
2. Morbidity and mortality reviews
3. Journal clubs
4. Grand rounds
5. Continuous professional activities (CPD) relevant to specialty

The practice-based component shall be achieved through the following:

- Demonstration of proper indications, protocols, techniques, and procedures.
- Direct supervision of fellows during the performance of their duties while affording appropriate feedback.
- Provision of opportunity for consultation with senior staff to solve clinical.
- Discussion of the methods of investigation, diagnosis, and management of various clinical problems during readout sessions.
- Conducting unknown case tutorials sessions at least once a block, providing advice on imaging techniques and patient management, and by conveying important teaching points during case readouts and reviews. They will also exhibit the capability to assimilate information and data and organize them into concise formal educational presentations. Participation in preparing and moderating relevant clinical-pathological meetings will also be required. A regional journal club meeting should be arranged every three months with active participation by the fellow.
- Review of reports dictated by the fellow prior to verification with the provision of verbal instruction when significant errors are found.
- Provision of guidance and assistance during the performance of research projects.
- Becoming familiar with the major radiological journals and reviewing them critically on a regular basis. They should learn how to conduct research by making every effort to participate in at least one research project during their training. Participation at a conference or scientific meeting is strongly encouraged.

Finally, every two weeks for at least one hour trainees should meet with their assigned mentors, in order to review performance reports (e.g., in-training evaluation reports (ITER), e-portfolio, mini-CEX, etc.).

### 3.3. Core Specialty Topics

#### 3.3.1. Knowledge:

**Modalities:** Fellows must become proficient in the physical principles, indications, setup, logistics, and performance of imaging modalities related to body imaging, including, but not limited to, CT scan, MRI, ultrasound, fluoroscopy, and conventional radiography. They must be knowledgeable in the advanced protocols, techniques, artifacts, contraindications, and precautions related to the performance of these examinations. They should also become proficient at post-processing techniques for 3D data sets by utilizing dedicated workstations.

**Contrast agents:** Fellows will become familiar with the variety of contrast agents available for use in body imaging examinations, including, but not limited to, oral contrast agents, intravenous sonographic, iodinated, or gadolinium-based agents, non-gadolinium-based MR intravenous (IV) contrast agents as well as agents used for fluoroscopic intra-cavitary opacification. They should be familiar with their preparation, indications, methods of administration, precautions, contraindications, limitations, and artifacts.

**Pathology:** Fellows will become familiar with the presentations, imaging findings, differential diagnosis, complications, and management of disease processes related to the adult abdomen and pelvis. These processes include, but are not restricted to, the following:

- a. Congenital abnormalities of the abdominal and genital organs
- b. Infectious diseases (acute and chronic)



- c. Inflammatory disorders
- d. Neoplastic diseases (benign or malignant) including detection, staging, and follow-up
- e. Vascular disorders including those of the chest and peripheral vasculature that are related to abdominal pathology
- f. Metabolic, endocrine, and depositional diseases of the abdominal viscera
- g. Traumatic and iatrogenic injuries
- h. Functional and mechanical disorders of body organ systems
- i. Emergencies, including investigation of the acute abdomen

Pathology encountered by the following *clinical disciplines* shall be included (though not limited to these areas):

1. General surgery
2. Internal medicine
3. Gastroenterology
4. Urology
5. Hepatobiliary surgery
6. Hepatology
7. Obstetrics and gynecology
8. Vascular surgery
9. Nephrology
10. Oncology
11. Endocrinology
12. Colorectal surgery
13. Emergency and critical care medicine
14. Family medicine

### 3.3.2. Skills

Fellows should become proficient in the performance of various procedures related to body imaging, including but not limited to: fluoroscopic positioning and maneuvers and sonographic and Doppler techniques as well as basic sonographic and CT-guided interventional procedures (drainages, biopsies, etc.).

**For radiation and safety:** fellows will acquaint themselves with all aspects related to radiation and magnetic field safety and protection, following accepted guidelines of practice to ensure the safety of both patients and staff.

### 3.3.3. Attitude:

**Professional attitudes** will be emphasized, including adherence to medical and Islamic ethics and practices as well as maintaining an attitude conducive to continuing education and learning. Constructive interaction with senior staff, clinicians, and technical staff will be exercised. Attributes such as responsibility, dedication, cooperation, teamwork, and a solid work ethic will be reinforced through emphasis upon role models.

### 3.4. Courses and workshops / Others:

#### Suggested Workshops and Courses

Workshop and Course	Description
Hepatic iron quantification	<ul style="list-style-type: none"> <li>• Half-day to one-day course</li> <li>• Learn different methodology in MRI hepatic iron quantification</li> <li>• Learn the proper protocol for image acquisition and image processing</li> <li>• Identify common mistakes</li> </ul>





MRI hepatic elastography	<ul style="list-style-type: none"> <li>• Half-day to one-day course</li> <li>• Learn indications of this procedure</li> <li>• Learn patient positioning and preparation</li> <li>• Learn proper protocol for image acquisition and image processing and interpretation</li> </ul>
MRI defecography	<ul style="list-style-type: none"> <li>• Half-day to one-day course</li> <li>• Learn indications of this procedure</li> <li>• Learn patient positioning and preparation</li> <li>• Learn proper protocol for image acquisition and image interpretation</li> </ul>
Ultrasound contrast enhanced imaging	<ul style="list-style-type: none"> <li>• One-day course.</li> <li>• Learn proper patient preparation and machine setting for proper image acquisition</li> </ul>
Advanced visualization and quantification	<ul style="list-style-type: none"> <li>• Learn the concept and uses of MIP</li> <li>• Learn the concept and uses of MIP</li> <li>• Learn the concept and uses of Volume rendered imaging (VR)</li> <li>• Learn the concept and uses of Cinematic rendering (CR)</li> <li>• How to perform multiplanar reformat (MPR)</li> <li>• How to perform curved planar reformat (CPR)</li> <li>• Uses in vascular analysis and MRCP to identify stenosis and dilatation</li> <li>• Quantification of perfusion parameters</li> <li>• Quantification of ADC</li> <li>• Quantification of IVIM parameters (intravoxel incoherent motion), true diffusion and perfusion effect from diffusion</li> </ul>
CT Colonography	<ul style="list-style-type: none"> <li>• One-day course</li> <li>• Learn patient preparation and positioning for the procedure</li> <li>• How to use a dedicated software to produce virtual colonography</li> <li>• Interpretation of the image</li> </ul>
*IRADS (Imaging-Reporting and Data System)	<ul style="list-style-type: none"> <li>• One-day course for a specified organ interpretation with multiple cases.</li> <li>• How to incorporate the different structured scoring systems IRADS, such as PI-RAD, LIRAD, and TI-RAD, in your report</li> </ul>
Imaging Informatics	<ul style="list-style-type: none"> <li>• One-day course</li> <li>• Introduction course about standards in image acquisitions, storing, transmission, and sharing. Basic non-technical information about DICOM standard</li> <li>• Introduction about integrating health enterprise (IHE) and its role in integrating PACS, RIS, and EMR</li> <li>• Helping candidates select the proper systems to run their departments in future</li> </ul>
CT Dual energy	<ul style="list-style-type: none"> <li>• One-day course</li> <li>• Basic physics related to dual energy</li> <li>• How to process multispectral images</li> </ul>





	<ul style="list-style-type: none"> <li>• Major clinical usage of this technique (iodine contrast removal, renal stone analysis, and increasing conspicuity of hepatic lesions)</li> </ul>
Ultrasound-guided interventional procedures	<ul style="list-style-type: none"> <li>• One-day workshop</li> <li>• Practicing ultrasound-guided procedures like needle/catheter insertions using phantoms</li> <li>• Learn needed patient preparation for abscess drainage or tissue biopsy</li> <li>• Identify different use of needles and catheters</li> </ul>

### 3.5 Trainee Selected Topics

- Liver Imaging-Reporting and Data System (LI-RAD)
- Prostate Imaging-Reporting and Data System (PI-RAD)
- Thyroid Imaging-Reporting and Data System (TI-RAD)
- Imaging of renal transplant
- Imaging of liver transplant
- Imaging of post treatment of HCC
- Carotid ultrasound assessment
- Imaging of uterine neoplasms
- Imaging of the liver using hepatobiliary agent in MRI
- Imaging of pancreatic neoplasm
- Acute and chronic assessment of inflammatory bowel disease



## ASSESSMENT METHODS

The Body Imaging Fellowship Training Program adopts multiple validated mechanisms to evaluate and assess the trainees. This process is thorough, meticulous and standard.

### Purpose:

- Enhances learning by providing formative assessment, enabling trainees to receive immediate feedback and to measure their own performance and identify areas for development.
- Drives learning and enhances the training process by clarifying what is required of trainees and motivating them to ensure they receive suitable training and experience.
- Provides robust, summative evidence that trainees are meeting the curriculum standards during the training program.
- Ensures that trainees are acquiring competencies within the domains of good medical practice.
- Assesses trainees' actual performance in the workplace.
- Ensures that trainees possess the essential underlying knowledge, skills, and attitude required for their specialty.
- Identifies trainees who should be advised to consider a career change.

### General Principles

This is a continuous assessment and evaluation throughout the academic year to be completed at the end of each block rotation.

The evaluations are based on the trainee's performance skills, knowledge, and attitude rather than on an individual basis and ought to be conducted by more than one faculty member if possible. The program directors must inform the fellows about the evaluation and assessment results and should discuss their points of strength and weakness with them.

Mid-rotation assessments and meetings must be arranged with the trainees if concerns are noted in their performance. Assessment and evaluation are solely adherent to the rules and regulations of training of SCFHS, including knowledge, skills, and manners.

### Assessment methods

The following mechanisms for assessment and evaluation apply to all trainees in the program, including junior (F1) and senior fellows (F2), unless otherwise stated. The distribution of marks and the percentage of each tool follows specific roles and is in accordance with SCFHS regulations.

#### A. Continuous Formative Assessment

##### **Assessment, promotion, and certification (please see the appendix for the forms)**

**Each year, the following** requirements must be successfully **fulfilled from (F1) to (F2) and from (F2) to board-eligible candidate:**

1. End-of-rotation ITER
2. Clinical Promotional Quiz consisting of an OSCE organized by the Scientific Committee of Body Imaging
3. Academic activities
4. Research activities

**A summative report of all four previously formative assessment methods will be prepared for each fellow at the end of each academic year to be promoted to the next level.**

##### **1. End-of-rotation ITER and continuous evaluation**

- This assessment is conducted toward the end of each training rotation throughout the academic year.
- To fulfill the CanMEDs competencies based on the end-of-rotation evaluation, the fellow's performance will be evaluated jointly by relevant staff for the following competencies:



- Performance of the trainee during daily work.
- Performance and participation in academic activities.
- Performance in a 10- to 20-min direct observational assessment of trainee–patient interactions. 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 after each assessment of a trainee–patient encounter.
- Performance of diagnostic and procedural skills by the trainee. The assessment tools used can be in the form of an educational portfolio (block evaluation, rotational Mini-CEX, and DOPS) (see appendices).
- Academic and clinical assignments should be documented on an annual basis using the electronic logbook (when applicable). Evaluations will be based on accomplishment of the minimum requirements for the procedures and clinical skills, clinical evaluation exercises, case-based discussions, and direct observation of practical skills.
- The CanMEDs-based competencies End-of-Rotation Evaluation Form must be completed within two weeks after the end of each rotation (preferably in an electronic format) and signed by at least two consultants. The Program Director will discuss the evaluation with the fellow, as necessary. The evaluation form will be submitted to the Local Training Supervisory Committee of the SCFHS within four weeks after the end of the rotation.
- Annual promotion depends on satisfactory annual overall evaluation and passing, and the average score for all rotations will not be less than 60%.

## 2. Research activities

- All fellows are required to conduct at least one research project during their training.
- For each academic year, an end-of-year research day is held in which each fellow’s research project for is evaluated.
- The components and scores follow the SCFHS Body Imaging Fellowship regulations.

## 3. End-of-year written OSCE examination

The end-of-year written exam will be held at the end of the academic year.

- The exam is held once a year.
- The same exam is used for all training levels, with different passing scores.

### 3.1 Objectives

- Assessing specialty knowledge.
- Using theoretical data to measure the candidate’s critical thinking in the form of solving problems, applying basic medical science to clinical problems, and making judgments with valid comparisons.

### 3.2 Examination format:

A Saudi Fellowship Specialty OSCE Examination shall consist of around 12–20 stations covering all aspects of the body imaging specialty as described in the blueprint (see Appendix).

### 3.3 Exam eligibility for first-year trainees only

As per SCFHS General Exam rules and regulations ([scfhs.org.sa](http://scfhs.org.sa)):

- Successful completion of the required period of fellowship training.
- Satisfactory annual and block assessments.

### 3.4 Exam eligibility for second-year trainees

- Successful completion of the required period of fellowship training.
- Satisfactory annual and block assessments.
- Successful completion of a research/audit project or as agreed by the exam committee.
- Certificate of completion of the training requirements.

As per SCFHS General Exam rules and regulations ([scfhs.org.sa](http://scfhs.org.sa)), the questions will cover all aspects of body imaging (see the Appendix blueprint).

## 4. Academic activities



The fellow will be responsible for conducting clinical meetings, including multidisciplinary tumor board meetings, teaching the residents, doing journal clubs, and giving departmental lectures. This will form ten percent (10%) of the total grade of the pooled assessment tools.

## **B- Summative assessment**

### **1- (Final Saudi Board Clinical Examination)**

#### **1.1 Objectives**

- Determining the ability of the candidate to practice independently and providing consultation in the general domain of their specialty to other healthcare professionals or other bodies that may seek assistance and advice.
- Ensuring that the candidate has the necessary clinical competencies relevant to their specialty including but not limited to procedural skills, communication skills, diagnosis, management, investigation, and data interpretation.

The board eligible fellow will need to pass the Clinical Promotional Exam, which consists of written multiple-choice questions and a SOE. The promotion will be awarded by the Saudi Certification Board of Body Imaging Fellowship.

#### **1.2 Exam eligibility**

- Successful completion of the required period of fellowship training.
- Obtaining a training completion certificate (or equivalent) issued by the local supervisory committee based on a satisfactory Final In-Training Evaluation Report (FITER) and any other related requirements assigned by any mentioned scientific boards (e.g., research, publication, etc.). A FITER example is outlined in the Appendix in the exam rules and regulations document on the SCFHS website.
- Any candidate who has missed a maximum of three (3) blocks of training of the whole fellowship program is allowed to sit the exam (written and clinical), but their results will be suspended until that missing period is completed.
- Register for the examination at least one block before the exam date.

#### **1.3 General rules**

- The Saudi Fellowship Final Examination will be held at the end of the second academic year once a year on a date published on the SCFHS website.
- The final clinical exam is restricted to second-year fellows.
- Successful candidates will be awarded the Saudi Board of Body Imaging Fellowship.
- Examination dates should be provided by the Specialty Examination Committee (SEC) in accordance with the fixed annual schedule submitted by the examination department.
- There shall be no reset examination.
- A candidate remains eligible for the Saudi Fellowship Final Written Examination for a period not longer than three years, if they can prove they have been clinically active.
- If the candidate does not pass within the three years, an exceptional attempt may be granted upon approval of the scientific council, provided evidence of that continuing clinical practice is presented.
- A candidate who failed to pass the Saudi Fellowship Final Written Examination, including the exception attempt, must repeat the final year of training, after which they can sit for the final written examination twice after the approval of the scientific council.
- After exhausting all the above attempts (maximum six), the candidate will not be permitted to sit the Saudi Fellowship Final Written Examination.

#### **1.4 Exam format**

##### **- *Written MCQs and OSCE exam.***

This exam consists of one page with 100 Single Best Answer (SBA) MCQs (it shall consist of one clinical scenario with SBAs from four options.)

The OSCE consists of 12 clinical cases covering all aspects of body imaging.



### - **Oral exam.**

The oral exam consists of 10–12 stations of clinical cases covering all aspects of the body imaging specialty. The examination is held once a year.

### **1.5 Passing score**

- A. The candidate should pass the promotion in order to sit the final exam, which includes a written MCQ exam and oral exam.
- B. The passing score will be determined for each exam based on the standard setting method that is approved by SCFHS, and different pass scores will be assigned to each level. See the exam rules and regulations document on the SCFHS website for more information.

## **CERTIFICATION**

A certificate of training completion will only be issued upon the fellow's successful completion of all program requirements. Candidates passing the final written and clinical examinations are awarded the Saudi Board of Body Imaging Fellowship Certificate.

## **Policies and Procedure:**

### **Training requirements**

1. Training shall be full-time. Trainee shall be enrolled for the entire two-year period.
2. Training shall be conducted in institutions accredited for training by the Saudi Board of Radiology and in the subspecialty of body imaging.
3. Training shall be comprehensive and include all aspects designated in the structure and content of the program.
4. Trainees shall be actively involved in patient care with a gradual progression of responsibility.
5. Trainees shall abide by the other training regulations and obligations set by the Saudi Board of Radiology and SCFHS.

### **On-call duties:**

The fellow will be on call exclusively for body imaging cases, backing up the on-call residents. The fellow will not be on call fewer than three times a block and no more than eight nights per block. This should include one weekend per block. Body Imaging Fellows are expected to attain proficiency in the recognition and management of emergent, urgent, and elective problems in body imaging. As part of this training, fellows participate in body imaging on-call duties with a faculty member who provides support, advice, and education. Fellows at all levels of training take on-call duties, providing complete coverage for all inpatient care and emergency admissions. The frequency of calls will be determined as per SCFHS rules.

## **VACATION AND CONFERENCE LEAVE**

Fellows will be permitted four weeks of annual leave during the program in addition to *only one* of the two Eid vacations (seven to ten days), as per SCFHS rules and regulations. Requests for vacation time must be made at least four weeks in advance and must be approved by the Program Director. In addition, fellows are granted conference leave as per SCFHS rules and regulations. The conference must also be approved by the Program Director.



## APPENDICES

### Appendix: Block evaluation form (ITER)

	n/a	Clear Fail	Borderline	ClearPass	ExceedExpectations
<b>*A. GENERAL</b>					
- Radiological Knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>*-Radiological Skills</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>*B. ROTATION SPECIFIC</b>					
-Radiological Knowledge	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>*-Radiological Skills</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>*C. COMMUNICATION</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>*D. COLLABORATION</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>*E. HEALTH ADVOCACY AND SAFETY</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>*F. REPORTING SKILLS</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>*G. SERVICE MANAGEMENT</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>*H. PROFESSIONALISM AND ETHICS</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
<b>*I. SCHOLARLY ACTIVITIES</b>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix: On call evaluation form

<b>On-call Evaluation Form</b>				
<b>Fellow</b>		<b>Level</b>		
		<b>Year</b>		
		<b>Assessment</b>		
	<b>Item</b>	<b>Oct-Jan</b>	<b>Feb-Apr</b>	<b>May-Aug</b>
	Attendance and availability	4	2	5
	Interaction with referring staff	4	3	5
	Interaction with technologists	3	4	5
	Accuracy of findings and reports	2	3	5
	Timeliness	4	3	5
	Appropriate utilization of seniors	4	2	4
	<b>Seniors only:</b>	69.93	56.61	96.57
	Active supervision of juniors	1	2	5
	Verification of preliminary reports	1	4	5
		57.5	57.5	97.5
	Date of assessment	Jan 2, 2014	April 7, 2014	July 11, 2014
	<b>SUBTOTALS</b>	70	57	97
	<b>FINAL TOTAL</b>	74		
<b>Evaluators</b>				
<b>Prog Dir</b>				
<i>Please ensure that all yellow cells are completed</i>				



## Appendix: Fluro and interventional procedural skills evaluation form

	n/a	Clear Fail	Borderline	ClearPass	ExceedExpectations
*Evaluates Indications/Risks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*Procedure Preparation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*Explains Procedure To Patient / Informed Consent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*Technical Procedures Skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*Prevents / Manages Complications	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
*Post-Procedure Management / Instructions	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**\*Comments (areas of strengths/areas for improvement)**





## Appendix: Radiology research skills

### Goals

- To become familiar with research study types and with their advantages and disadvantages as is pertinent to radiology.
- To be able to ask research questions and design the proper research method to answer those questions.
- To understand and practice the proper methods in research study conduction, data collection, and results analysis and discussion.
- To be aware of current research topics in radiology.
- To be familiar with the ethical requirements of research and to adhere to them.
- To acquire essential skills in writing scientific manuscripts.
- To be aware of resources in radiology research.
- To acquire the skills of scientific presentation and performing public discussions.

### Training Methods

- A dedicated one-block, full-time rotation in either research, quality management, or performance improvement project is conducted during the second year of training. If fellows choose to do a research project, then, during this block, they will select the supervisor, work on the selection of a research topic, and start the project.
- It is expected that the project might span more than one block. Therefore, completion of the work will need to be conducted in parallel with the other subsequent rotations.
- The supervisor will help the fellows gain access to essential resources that will allow the proper understanding of research skills and periodically discuss their progress with them.
- Attendance at dedicated courses or workshops that enhance research skills may be required by the program.
- Oral abstract presentation of the study results at the end of the year in the Fellows Radiology Research Day.
- It is highly desirable for fellows to work on presenting research results at national and/or international meetings and to work hard to publish their work in indexed journals.

### Evaluation

- Attendance at designated courses/lectures will be monitored and incorporated into the annual evaluation score.
- Panel scoring of the research abstract presentation at the end of the second year during the Fellows Radiology Research Day. This will count as the rotation score for that block.



## Appendix: Research evaluation

Saudi Board in Body Imaging Fellowship Research Evaluation Sheet

Name of the candidate: \_\_\_\_\_ F1 F2

Date \_\_\_\_\_ Research title: \_\_\_\_\_

	COMPONENT	Marks	CANDIDATE SCORE	COMMENTS
Part 1- Written Text Evaluation	1. Topic originality	3		
	2. Abstract/summary	5		
	3. Aims and objectives	5		
	4. Literature review	6		
	5. Methodology	12		
	6. Results (data analysis, presentation)	12		
	7. Discussion conclusions and recommendations	5		
	8. Ethical considerations	2		
	9. Style and structure of the text, tables, and diagrams	5		
	10. References	5		
	<b>Total Written Evaluation</b>	<b>60</b>		
Part 2- Defense	1. Presentation	30		
	2. Defense	10		
	<b>Total Defense Evaluation</b>	<b>40</b>		
	<b>Total Cumulative Marks</b>	<b>100</b>		

Training level	Assessment tool	Content	Passing%	Note
F1	ITER/DOPS	All rotations	Defined by SCFHS	As per SCFHS promotion rules and regulations (see element 5 of continuous evaluation regulation)
	Research task	Comparative studies Case report Review article/poster Machine learning papers Audits/quality		
	Academic activities	Multidisciplinary meeting Lectures with resident/staff Journal Clubs Department meetings		
	Promotional OSCE (امتحان الترقية)	Clinical and practical cases		
F2	ITER/DOPS	All rotation	Defined by SCFHS	As per SCFHS promotion rules and regulations (see element 5 of continuous evaluation regulation)
	Research task	Comparative studies Case report Review article/poster Machine learning papers Audits/quality		
	Academic activities	Multidisciplinary meeting Lectures with resident/staff Journal clubs Department meetings		
	Promotion/OSCE (امتحان الترقية)	Clinical and practical cases		
Final board exam (النهائي)	Written exam (الامتحان الكتابي)	MCQs		As per SCFHS examination rules and regulations
	Oral exam (السريري/الشفهي)	Clinical cases		



## Appendix: Oral, OSCE and MCQ Blueprint

No.	Sections	Percentage (%)
1	Liver	20%
2	Pancreas, spleen, biliary tree	20%
3	Genitourinary	20%
4	Gastrointestinal	20%
5	Acute abdomen	10%
6	Physics, ethics, research, professionalism and patient safety	10%
<b>Total</b>		<b>%100</b>