

*This document applies to those who begin training on or after July 1, 2022.*

This document is to be used in conjunction with the *Entrustable Professional Activity User Guide*, which is available on the Royal College’s website.

## **Diagnostic Radiology: Transition to Discipline EPA #1**

### **Navigating information systems used in Diagnostic Radiology**

#### Key Features:

- This EPA focuses on accessing and using information systems to gather clinical data from the patient’s chart and the image storage system (e.g., PACS).
- This includes summarizing the history, pertinent physical examination findings and results of relevant investigations from the clinical record and retrieving the imaging study and pertinent priors for review with a supervisor.
- This EPA may be observed in patients undergoing any medical imaging study; the observation of this EPA is based on a single case.
- This EPA does not include the use of advanced PACS functions—that is a Foundation stage activity.

#### Assessment Plan:

Case review with staff radiologist, Core or TTP resident, or fellow

Use Form 1

Collect 2 observations of achievement

- At least 2 different assessors

CanMEDS Milestones

- 1 COM 2.2 Access the medical record and retrieve clinical information**
- 2 ME 2.2 Interpret the findings of the history, physical examination and investigations in light of the clinical question**
- 3 ME 3.4 Use the PACS system to retrieve images**
- 4 ME 3.4 Identify and retrieve pertinent prior imaging**
- 5 ME 3.4 Display images to review a study**

## **Diagnostic Radiology: Transition to Discipline EPA #2**

### **Using the dictation system**

#### Key Features:

- This EPA focuses on using a dictation system to record a simple or normal report.
- At this stage, the resident is not expected to interpret an image; this EPA is limited to documenting the report as reviewed with a supervisor.

#### Assessment Plan:

Review of report by staff radiologist

Use Form 1

Collect 1 observation of achievement

#### CanMEDS Milestones:

**1 COM 5.1 Use the dictation system to generate, edit and issue a report**

## **Diagnostic Radiology: Transition to Discipline EPA #3**

### **Recognizing normal anatomy in radiography and CT imaging**

#### Key Features:

- This EPA focuses on applying knowledge of anatomy and imaging technique to identify normal structures and landmarks.

#### Assessment Plan:

Image review with staff radiologist, Core or TTP resident, or fellow

Use Form 1. Form collects information on:

- Modality: radiography; CT; other
- Body region: abdomen/pelvis; cardiothoracic; head; MSK; spine

Collect 7 observations of achievement

- At least 1 abdomen/pelvis radiograph
- At least 1 abdomen/pelvis CT
- At least 1 chest radiograph (i.e., cardiothoracic)
- At least 1 chest CT
- At least 1 head CT
- At least 1 MSK radiograph
- At least 1 spine radiograph or CT

#### CanMEDS Milestones:

- 1 ME 1.3** Apply knowledge of image generation when using radiography and CT modalities
- 2 ME 1.3** Apply knowledge of patient positioning
- 3 ME 3.4** Identify normal structures and anatomic landmarks
- 4 ME 3.4** Identify when image quality is affected by patient positioning

## **Diagnostic Radiology: Transition to Discipline EPA #4**

### **Identifying and assessing unstable patients, providing initial management, and obtaining help**

#### Key Features:

- This EPA includes recognizing serious, life-threatening, or critical illness and providing initial investigation and management.
- An important aspect of this EPA is the timely recognition of the need for additional assistance and/or notification to the attending physician.

#### Assessment Plan:

Direct observation and/or case review by supervisor (most responsible physician (MRP), other consulting staff, senior resident)

Use Form 1. Form collects information on:

- Presentation: acute respiratory distress; allergic reaction; altered level of consciousness; chest pain; hemodynamic instability; hypoglycemia; other

Collect 5 observations of achievement

- Any 4 different presentations

#### CanMEDS Milestones:

- 1 ME 2.1 Recognize instability and acuity in a clinical presentation**
- 2 ME 2.1 Determine the priorities for patient care**
- 3 P 1.1 Work within personal limits, seeking assistance as needed**
- 4 ME 2.2 Provide assessment and initial stabilization of ABCs**
- 5 ME 2.2 Perform a history and physical exam relevant to the patient presentation, in a time-effective manner**
- 6 ME 2.2 Select and/or interpret investigations**
- 7 ME 2.4 Develop and implement a plan for initial management**
- 8 ME 4.1 Determine the appropriate disposition and/or setting for ongoing care**
- 9 COL 1.2 Consult as needed with other health care professionals, including other physicians**
- 10 COM 5.1 Document the clinical encounter to adequately convey clinical reasoning and the rationale for decisions**

## **Diagnostic Radiology: Transition to Discipline EPA #5**

### **Assessing patients with common medical or surgical presentations**

#### Key Features:

- This EPA includes performing a clinical assessment, including history and physical exam, developing a differential diagnosis, and selecting and prioritizing laboratory and imaging investigations.
- This EPA will be observed in the ambulatory, emergency department or inpatient setting, with adult and pediatric patients, in a range of clinical conditions.

#### Assessment Plan:

Case review with supervisor (staff or senior resident)

Use Form 1. Form collects information on:

- Setting: inpatient; outpatient; emergency department
- Demographic: adult; pediatric; obstetric
- Presentation: medical; surgical

Collect 7 observations of achievement

- At least 2 of each type of presentation
- At least 1 pediatric case

#### CanMEDS Milestones:

- 1 ME 2.2 Gather a relevant clinical history**
- 2 COM 2.1 Use patient-centred interviewing skills**
- 3 ME 2.2 Perform a physical exam relevant to the presentation**
- 4 ME 2.2 Select and/or interpret investigations**
- 5 ME 2.2 Develop a differential diagnosis**
- 6 ME 2.2 Synthesize and organize clinical information for clear and succinct presentation to supervisor**
- 7 ME 2.4 Identify and/or monitor key clinical features in the implementation of a management plan**
- 8 COM 3.1 Convey information to the patient and/or family clearly and compassionately**
- 9 COL 1.2 Work effectively as a member of the clinical team**

**10 COM 5.1 Document the essential elements of a clinical encounter using a structured approach**

**11 P 1.1** Complete assigned responsibilities

## **Diagnostic Radiology: Transition to Discipline EPA #6**

### **Working effectively as a member of the interprofessional team**

#### Key Features:

- This EPA focuses on the role of the physician as a member of the interprofessional team.
- This includes contributing to the work of the team, understanding and respecting the roles of other team members, and demonstrating appropriate professional behaviours.
- This EPA will be observed in medical imaging as well as in clinical care settings.
- The observation of this EPA is based on a period of time of at least one week.

#### Assessment Plan:

Direct and indirect observation by supervisor, with input from other members of the interprofessional team

Use Form 1. Form collects information on:

- Setting: clinical rotation; medical imaging department
- Includes input from (select all that apply): other supervisor(s); nurse(s); technologist(s); other physician/surgeon(s); other resident(s) or student(s); other

Collect feedback during at least 3 rotations during Transition to Discipline

- At least 1 observation in medical imaging department
- At least 2 observations in clinical rotations
- At least 2 observations that include input from nurses or other health professionals

#### CanMEDS Milestones:

- 1 P 1.1 Behave in a professional manner**
- 2 COL 1.2 Demonstrate an understanding of the scope and expertise of other health care professionals**
- 3 COL 1.3 Communicate effectively with physicians and other health care professionals**
- 4 P 1.1 Respond punctually to requests from patients or other health care professionals**
- 5 COL 1.1 Respond appropriately to input from other health care professionals**
- 6 HA 1.1 Identify patient needs and help provide access to health services and/or resources**



## Diagnostic Radiology: Foundations EPA #1

### Recognizing normal radiologic anatomy and its variants

#### Key Features:

- This EPA builds on the skills of the Transition to Discipline stage to include a variety of imaging modalities.
- Examples of the radiological anatomy expected at this stage include cardiothoracic anatomy (lung segments, heart chambers, vessels and their branches), MSK anatomy (major tendons/ligaments; osseous anatomy and variants), neuro and head and neck anatomy (branches of carotid arteries and Circle of Willis; brain lobar anatomy; neck spaces; facial bones) and abdominal/pelvic anatomy (liver segments; vascular anatomy of liver; major branches of the abdominal aorta; abdominal spaces; female pelvis).

#### Assessment Plan:

Image review with staff radiologist, Core or TTP resident, fellow, or by image quiz/OSCE

Use Form 1. Form collects information on:

- Modality: CT; radiography; ultrasound; other
- Body region: abdomen/pelvis; cardiothoracic; MSK; neuro/head and neck
- Observation: image review; quiz/OSCE

Collect 12 observations of achievement

- At least 3 from each body region
- A variety of imaging modalities
- At least 8 by image review
- At least 5 different assessors
- At least 3 staff radiologists

#### CanMEDS Milestones:

- 1 ME 1.3** Apply knowledge of radiological anatomy
- 2 ME 1.3** Apply knowledge of image generation
- 3 ME 3.4 Identify normal structures and anatomic landmarks**
- 4 ME 3.4 Recognise normal anatomical variants**

## Diagnostic Radiology: Foundations EPA #2

### Acquiring standard images using ultrasonography

#### Key Features:

- This EPA includes attention to patient comfort, privacy and positioning, as well as applying knowledge of image generation and acquisition for ultrasound.
- This EPA does not include image interpretation.
- The observation of this EPA is based on a single US study.

#### Assessment Plan:

Direct observation and/or review of generated images by staff radiologist or fellow, with input from the sonographer/technologist

Use Form 1. Form collects information on:

- Study: abdomen; testicle/scrotum; female pelvis; DVT; soft-tissue/surface; other
- Doppler: no; yes
- Transvaginal: no; yes
- Findings (write in):

Collect 10 observations of achievement

- At least 3 abdominal
- At least 1 testicular, including Doppler
- At least 3 female pelvis; including at least 2 transvaginal and at least 1 with a finding of a first trimester embryo
- At least 1 assessment for DVT
- At least 1 soft-tissue/surface

#### CanMEDS Milestones:

- 1 ME 1.3 Apply knowledge of anatomy, physiology and pathophysiology**
- 2 ME 1.3 Apply knowledge of the physical principles of ultrasound, including Doppler**
- 3 COM 1.2 Optimize the physical environment for patient comfort and privacy**
- 4 ME 3.5 Position the patient to optimize the study/procedure**
- 5 ME 3.5 Adjust instrument settings to optimize image quality**
- 6 ME 3.5 Obtain standard views**
- 7 COM 3.1 Communicate effectively with the patient during the study/procedure**
- 8 ME 3.5 Evaluate patient comfort and safety, and adjust the study/procedure as needed**

**9 COM 5.1** Record high quality images of significant findings

**10 ME 3.4** Assess the quality and validity of the study and any impact on the diagnostic interpretation

### Diagnostic Radiology: Foundations EPA #3

#### Protocolling requests for medical imaging for patients with acute and common presentations

##### Key Features:

- This EPA focuses on the work of a diagnostic radiologist to review, triage and plan for the delivery of medical imaging studies/procedures using different modalities.
- This includes gathering information about the patient condition and purpose of the request, establishing the urgency, selecting the appropriate protocol and demonstrating stewardship of medical imaging resources.
- This may include consideration of patient sedation or pre-treatment for prevention of contrast reactions.
- It also includes communicating with technologists and documenting the plan for the imaging study or procedure.
- The observation of this EPA is based on a batch of imaging requests.
- At this stage, the batch should focus on requests for acute and common, inpatient or emergency department adult cases, primarily for CT and US imaging.

##### Assessment Plan:

Review of a batch of requests with staff radiologist, which may include input from technologist

Use Form 1. Form collects information on:

- Number of requests in batch (write in):
- Batch of inpatient or emergency adult cases: no; yes
- Body region (select all that apply): abdomen/pelvis; cardiothoracic; head and neck; MSK; neuro; soft tissue; spine; vascular; other
- Modality (select all that apply): CT; ultrasound; other

Collect at least 5 observations of achievement

- At least 5 different assessors

##### CanMEDS Milestones:

- 1 ME 2.2 Gather and synthesize patient information to establish the clinical question**
- 2 ME 3.1 Apply diagnostic algorithms for the investigation of conditions examined by medical imaging modalities**
- 3 ME 3.4 Modify and/or customize the request as needed**
- 4 ME 3.4 Determine the priority of the request and triage the study**
- 5 COM 5.1 Document the plan for the imaging study or procedure**

- 6 COL 1.2 Communicate effectively with technical staff about the urgency and/or customization of diagnostic radiology studies/procedures**
- 7 L 2.1** Allocate imaging resources judiciously, recognizing redundancies and demonstrating awareness and stewardship of medical imaging resources

## Diagnostic Radiology: Foundations EPA #4

### Applying a systematic search pattern to the analysis of medical imaging studies

#### Key Features:

- This EPA focuses on an approach that ensures a comprehensive analysis of an imaging study, including an assessment of the quality of the generated image.
- At this stage and for this EPA, it is not expected that the resident will identify or diagnose all relevant findings.

#### Assessment Plan:

Image review, case discussion and/or review of report by staff radiologist, Core or TTP resident, or fellow

Use Form 1. Form collects information on:

- Body region: abdomen/pelvis; cardiothoracic; head; neck; MSK; spine; other
- Modality: CT; radiography; ultrasound

Collect 10 observations of achievement

- At least 1 abdomen/pelvis CT
- At least 1 abdomen/pelvis radiograph
- At least 1 abdomen/pelvis ultrasound
- At least 1 cardiothoracic CT
- At least 1 cardiothoracic radiograph
- At least 1 head CT
- At least 1 neck CT
- At least 1 MSK CT
- At least 1 MSK radiograph
- At least 1 spine radiograph

#### CanMEDS Milestones:

- 1 ME 3.4 Display images to review a study**
- 2 ME 1.3 Apply knowledge of radiological anatomy**
- 3 ME 3.4 Identify normal structures and anatomic landmarks**
- 4 ME 3.4 Assess the quality of the study and any impact on the diagnostic interpretation**
- 5 ME 3.4 Demonstrate the use of a systematic search pattern**

## Diagnostic Radiology: Foundations EPA #5

### Detecting acute and/or common abnormalities on imaging studies

#### Key Features:

- This EPA focuses on the application of the knowledge of anatomy and imaging technique to address the clinical question.
- This includes identification of acute and/or common findings significant to the patient's care and recognition of critical findings that warrant communication with the referring physician.
- This EPA does not include identification of all findings on the image – for example, in a CT performed for pulmonary embolism, it is not expected that a resident at this stage would necessarily identify findings consistent with interstitial lung disease.

#### Assessment Plan:

Image review with staff radiologist, Core or TTP resident, or fellow, which may include input from technologists

Use Form 1. Form collects information on:

- Body region: abdomen/pelvis; cardiothoracic; MSK; neuro
- Patient location: emergency department; inpatient; outpatient
- Modality: CT; fluoroscopy; radiography; ultrasound
- Finding (write in):

Collect 20 observations of achievement

- At least 5 of each body region
- At least 1 emergency department case for each body region
- At least 2 CTs
- At least 2 radiographs
- At least 2 ultrasounds
- A variety of findings
- At least 5 different assessors
- At least 3 staff radiologists

#### CanMEDS Milestones:

- 1 ME 2.2 Gather and synthesize patient information to establish the clinical question**
- 2 ME 3.4 Assess the quality of the study and any impact on the diagnostic interpretation**
- 3 ME 3.4 Identify normal structures and anatomic landmarks**
- 4 ME 3.4 Identify key findings and common or significant incidental findings**
- 5 ME 3.4 Recognize critical findings that warrant verbal reporting to the referring**

**physician**

**6 P 1.1 Work within personal limits, seeking assistance as needed**



## Diagnostic Radiology: Foundations EPA #6

### Generating a differential diagnosis for patients with acute or common findings

#### Key Features:

- This EPA focuses on integrating the findings of an imaging study to generate a differential diagnosis.
- Examples of acute or common findings include: pulmonary nodule/mass; consolidation; interstitial abnormalities; cardiomegaly; pneumomediastinum; pleural effusion; intra-axial intracranial hemorrhage; intra-axial mass; hydrocephalus; neck mass; bone lesion; soft tissue mass; joint effusion; arthritis; abdominal/pelvic solid organ lesion/mass; bowel wall thickening; dilated bowel; pneumoperitoneum; adnexal mass; hydronephrosis.

#### Assessment Plan:

Image review and/or review of primary report by staff radiologist, Core or TTP resident, or fellow

Use Form 1. Form collects information on:

- Body region: abdomen/pelvis; cardiothoracic; MSK; neuro
- Finding (write in):

Collect 16 observations of achievement

- At least 4 from each body region
- A variety of findings
- At least 5 different assessors
- At least 3 different staff radiologists

#### CanMEDS Milestones:

- 1 ME 2.2** Gather and synthesize patient information to establish the clinical question
- 2 ME 1.3** Apply knowledge of anatomy, physiology and pathophysiology
- 3 ME 3.4 Summarize pertinent positive and negative findings**
- 4 ME 3.4 Correlate findings with clinical information and other imaging modalities**
- 5 ME 3.4 Generate an appropriate differential diagnosis**
- 6 ME 3.4 Provide an appropriate order for the differential diagnosis based on the imaging findings and clinical context**

## Diagnostic Radiology: Foundations EPA #7

### Communicating critical findings of medical imaging studies

#### Key Features:

- This EPA focuses on recognizing when a finding needs timely communication with the referring service and communicating effectively with that service.
- This includes contacting the responsible clinician, clearly conveying the findings and their significance, answering questions, and providing recommendations.
- It also includes documenting the interaction in the imaging report.

#### Assessment Plan:

Direct observation by staff radiologist, with review of resident's notation

Use Form 1

Collect 3 observations of achievement

- At least 2 different assessors

#### CanMEDS Milestones:

- 1 ME 3.4 Recognize critical findings that warrant verbal reporting to the referring physician**
- 2 ME 3.4 Summarize findings of clinical relevance**
- 3 ME 2.4 Provide suggestions for further testing and/or patient disposition as relevant**
- 4 COL 1.3 Convey information to clinicians in a manner that enhances patient management**
- 5 P 1.1 Behave in a professional manner**
- 6 ME 1.6 Demonstrate insight into one's own limits of expertise**
- 7 COM 5.1 Document in the imaging report actions taken to communicate significant or unexpected findings**

## Diagnostic Radiology: Foundations EPA #8

### Providing reports for acute and/or common findings of medical imaging studies

#### Key Features:

- This EPA focuses on the written communication skills of documenting the findings of imaging studies.
- This includes generating an accurate and concise report, and recommending appropriate management, next steps and/or follow-up.
- The observation of this EPA is based on the review of a single report, which must be solely the work of the resident.

#### Assessment Plan:

Review of report by staff radiologist, Core or TTP resident, or fellow

Use Form 1. Form collects information on:

- Body region: abdomen/pelvis; chest/cardiac; MSK; neuro
- Modality: CT; radiography; ultrasound; other
- Diagnosis: infection; neoplasm; trauma; vascular; other

Collect 12 observations of achievement

- At least 5 of each body region (any modality)
- At least 2 abdomen/pelvis CT
- At least 2 chest/cardiac CT
- At least 2 MSK CT
- At least 2 neuro CT
- At least 2 ultrasounds
- A variety of diagnoses
- At least 5 assessors
- At least 3 staff radiologists

#### CanMEDS Milestones:

- 1 ME 3.4 Summarize findings of clinical relevance**
- 2 ME 3.4 Generate an appropriate differential and most likely diagnosis**
- 3 COM 5.1 Use a systematic method of reporting, integrating clinical and imaging information**
- 4 COM 5.1 Provide clear, concise, accurate and grammatically correct reports**
- 5 COL 1.3** Convey information to clinicians in a manner that enhances patient management
- 6 COL 1.3** Convey diagnostic uncertainty, as needed

**7 ME 2.4 Provide suggestions for further testing and/or patient disposition as relevant**

## Diagnostic Radiology: Core EPA #1

### Interpreting diagnostic radiology imaging studies

#### Key Features:

- The focus of this EPA is the detection and interpretation of major and minor findings in imaging of any body region using any imaging modality.
- This includes assessing image quality, applying a systematic approach to image review, integrating findings with the clinical information and prior imaging studies, establishing a most likely diagnosis and a differential diagnosis, and providing recommendations for management.
- The observation of this EPA is based on a batch of imaging studies; a batch being at least a half-day's work.
- As a whole, the observations for this EPA should document achievement in the full breadth of body regions and imaging modalities, in patients of all ages and with a variety of presentations and acuity of illness (i.e., inpatient, emergency, outpatient, follow-up).

#### Assessment Plan

Review of a batch of imaging studies with staff radiologist

Use Form 1. Form collects information on:

- Number in batch (write in):
- Number of pediatric cases (write in):
- Body region (select all that apply): abdomen/pelvis; breast; cardiac; chest; head and neck; MSK; neuro; spine; obstetrical; vascular
- Modality (select all that apply): CT; fluoroscopy; mammography; MRI; nuclear medicine; radiography; ultrasound

Collect 75 observations of achievement

- At least 20 abdomen/pelvis batches
- At least 6 breast batches
- At least 2 cardiac batches
- At least 8 chest batches
- At least 10 MSK batches
- At least 10 neuro batches
- At least 3 batches that include head and neck imaging
- At least 5 batches that include spine imaging
- At least 3 batches that include vascular imaging
- At least 2 nuclear medicine batches
- At least 6 ultrasound batches
- At least 2 ultrasound batches that include obstetrical ultrasound
- At least 6 batches that include pediatric cases, across diverse modalities
- At least 2 assessors for each body region and/or modality

#### CanMEDS Milestones

**1 ME 3.4** Assess the quality of the study and any impact on the diagnostic interpretation

- 2 ME 2.2** Gather and synthesize patient information to establish the clinical question
- 3 ME 3.4** Use computer applications to optimize the images and/or views needed to answer the clinical question
- 4 ME 3.4** Use a systematic search pattern
- 5 ME 3.4** Identify anatomic landmarks, normal anatomy and variants, artefacts and imaging pitfalls
- 6 ME 3.4 Identify all major and minor findings**
- 7 ME 3.4 Summarize findings of clinical relevance**
- 8 ME 3.4 Correlate findings with clinical information and other imaging modalities**
- 9 ME 3.4 Generate an appropriate differential and most likely diagnosis**
- 10 ME 3.4 Recognize critical findings that warrant verbal reporting to the referring physician**
- 11 ME 3.4 Provide recommendations for further imaging and/or management**

## Diagnostic Radiology: Core EPA #2

### Providing reports that guide patient management

#### Key Features:

- This EPA focuses on the communication skills of documenting the findings of imaging studies.
- This includes generating an accurate concise report in a timely manner, with a focus on grammar and appropriate lexicon.
- The achievement of this EPA requires competence across the breadth of imaging studies (i.e., all modalities, all body regions), including some cases with diagnostic uncertainty or complexity.
- The observation of this EPA is based on the supervisor review of a batch of reports; a batch representing at least a half day's work.

#### Assessment Plan:

Review of a batch of reports by staff radiologist

Use Form 1. Form collects information on:

- Number in batch (write in):
- Number of pediatric cases (write in):
- Body region (select all that apply): abdomen/pelvis; breast; cardiac; chest; head and neck; MSK; neuro; obstetrical; spine; vascular
- Modality (select all that apply): CT; fluoroscopy; mammography; MRI; nuclear medicine; radiography; ultrasound

Collect 25 observations of achievement

- At least 4 abdomen and pelvis batches
- At least 2 breast batches
- At least 2 cardiac batches
- At least 2 chest batches
- At least 3 MSK batches
- At least 3 neuro batches
- At least 2 batches that include head and neck imaging
- At least 2 batches that include spine imaging
- At least 3 batches that include vascular imaging
- At least 2 nuclear medicine batches
- At least 3 ultrasound batches
- At least 2 ultrasound batches that include obstetrical ultrasound
- At least 3 batches that include pediatric cases, across diverse modalities
- At least 2 assessors for each body region and/or modality

#### CanMEDS Milestones:

**1 ME 3.4 Summarize findings of clinical relevance**

**2 COM 5.1 Use a systematic method of reporting, integrating clinical and imaging information**

- 3 COM 5.1 Provide clear, concise, accurate and grammatically correct reports**
- 4 ME 3.4 Provide recommendations for further imaging and/or management**
- 5 COL 1.3** Convey information to clinicians in a manner that enhances patient management
- 6 COM 5.1 Provide an appropriately ordered differential diagnosis and convey diagnostic uncertainty**
- 7 COM 5.1 Communicate critical results urgently to the referring clinician**
- 8 L 4.1 Report the caseload of imaging studies within an appropriate turnaround time**



## Diagnostic Radiology: Core EPA #3

### Planning and performing invasive image-guided procedures

#### Key Features:

- This EPA includes diagnostic and therapeutic image-guided procedures using any imaging modality and in any body region.
- This includes reviewing the request and assessing patient suitability and eligibility for the procedure or alternative procedures and making a plan for the procedure, including the choice of imaging modality, approach to the procedure and choice of equipment.
- It includes all aspects of performing the procedure: obtaining consent, providing patient sedation and pre-procedural care; performing the technical skills of the procedure; documenting the procedure; and providing post-procedural care.
- It also includes providing management for any immediate reactions, adverse events or complications arising from the procedure.

#### Assessment Plan:

Direct observation by staff radiologist, fellow, or TTP resident, with input from medical radiation technologist, sonographer and/or nurse

Use Form 1. Form collects information on:

- Procedure: aspiration - joint; aspiration – paracentesis; aspiration – thoracentesis; aspiration - other; biopsy; catheter manipulation; drainage tube insertion; enteric tube placement; lumbar puncture; vascular access; other
- Body region: abdomen/pelvis; breast; chest/lung; other
- Modality: CT; fluoroscopy; US
- Demographic: adult; pediatric

Collect 30 observation of achievement

- At least 3 vascular access procedures
- At least 5 fluoroscopic guided procedures, including at least 2 lumbar punctures
- At least 5 image-guided aspiration procedures, including at least 1 paracentesis and at least 1 thoracentesis
- At least 3 image-guided drainage tube insertions, including at least 1 abdominal/pelvic drainage tube insertion and 1 chest drainage tube insertion
- At least 10 image-guided biopsies, including at least 2 CT-guided and at least 2 US guided biopsies, and at least 2 breast, at least 2 abdominal solid organ and at least 2 lung biopsies

#### CanMEDS Milestones:

- 1 ME 2.2 Assess the patient's suitability to proceed with the procedure, reviewing relevant investigations and medical history**
- 2 ME 3.2 Obtain and document informed consent, explaining the risks and rationale for the procedure**

- 3 ME 3.5** Demonstrate effective pre-procedure planning and preparation
- 4 ME 3.5** **Demonstrate aseptic technique: skin preparation; draping; establishing and respecting the sterile field; hand cleanse, gown and glove**
- 5 ME 3.5** **Evaluate patient comfort and safety, and adjust the study/procedure as needed**
- 6 ME 3.5** **Perform the procedure in a skilful and safe manner**
- 7 COL 1.2** **Communicate effectively with supervisor, nurses, and/or assistants during the procedure**
- 8 P 1.1** **Work within personal limits, seeking assistance as needed**
- 9 ME 5.2** Apply safe practices in the imaging suite to minimize occupational and patient risk
- 10 ME 3.5** **Recognize and manage immediate complications**
- 11 COM 5.1** Document the procedure

## Diagnostic Radiology: Core EPA #4

### Acquiring standard images using fluoroscopy

#### Key Features:

- This EPA includes attention to patient comfort, privacy and positioning, and applying knowledge of image generation and acquisition for fluoroscopy.
- This includes decisions about the use of contrast agent.
- This EPA does not include image interpretation.

#### Assessment Plan:

Direct observation and/or review of generated images by staff radiologist or fellow, with input from the technologist

Use Form 1. Form collects information on:

- Study: gastrointestinal; genitourinary; other
- Demographic: adult; pediatric
- Acuity: elective; urgent; emergent

Collect 13 observations of achievement

- At least 5 gastrointestinal studies
- At least 5 genitourinary studies
- At least 3 other fluoroscopic studies
- At least 2 studies in the pediatric age group

#### CanMEDS Milestones:

- 1 ME 1.3** Apply knowledge of anatomy, physiology and pathophysiology
- 2 COM 1.2** Optimize the physical environment for patient comfort and privacy
- 3 ME 3.5** Position the patient to optimize the study/procedure
- 4 ME 3.5** Adjust instrument settings to optimize image quality
- 5 ME 2.4** Use pharmacologic agents, contrast and/or other techniques to optimize the study
- 6 COM 3.1** Communicate effectively with the patient during the procedure
- 7 ME 3.5** Evaluate patient comfort and safety, and adjust the study/procedure as needed
- 8 COM 5.1** Record high quality images of significant findings
- 9 ME 3.4** Assess the quality and validity of the study and any impact on the diagnostic interpretation

**10 COL 1.2 Work effectively with technologists and other health care providers**

## Diagnostic Radiology: Core EPA #5

### Assessing, investigating and optimizing the quality of imaging studies

#### Key Features:

- This EPA focuses on the radiologist's role in ensuring the diagnostic quality of imaging studies in order to answer a clinical question, applying knowledge of image generation and acquisition for that modality.
- This includes assessing the quality of images acquired and determining whether quality impacts diagnostic interpretation and/or patient safety, e.g., motion artefact, suboptimal contrast timing, misplaced markers.
- It includes development of a plan to address the quality issue.
- Examples include adjusting the process of the study (patient positioning, additional views, using contrast, using sedation), retaking certain images, acquiring supplemental images as necessary (e.g., acquiring US images, requesting thin reformats of CT), or recommending another diagnostic study.
- This EPA does not include protocoling, image interpretation and reporting.
- The observation of this EPA is based on an individual case with image quality concerns raised by the technologist or raised by the resident upon review of the image(s).

#### Assessment Plan:

Review of imaging case with staff radiologist, may include input from technologist

Use Form 1. Form collects information on:

- Modality: CT; mammography; MRI; radiography; ultrasound
- Issue identified by: technologist; resident; other

Collect 15 observations of achievement

- At least 3 CT studies
- At least 3 mammography studies
- At least 3 MRI studies
- At least 3 radiography studies
- At least 3 ultrasound studies
- At least some issues that were identified by resident

#### CanMEDS Milestones:

- 1 ME 2.2** Gather and synthesize patient information to establish the clinical question
- 2 ME 3.4** Detect issues with image quality, such as artefacts, incorrect markers and positioning
- 3 ME 3.4** Identify the cause(s) of poor image quality
- 4 ME 1.3** Apply knowledge of image generation, including technical aspects, patient

positioning and use of contrast media or additional pharmaceuticals

- 5 **COL 1.2** Provide feedback to technical staff
- 6 **COL 1.2 Work with technical staff to solve imaging challenges and optimize the quality of studies**
- 7 **ME 3.4** Adjust the process of the study
- 8 **ME 3.4** Acquire supplemental images, as necessary
- 9 **ME 5.2 Apply the ALARA principle**
- 10 **ME 3.4 Determine whether a study needs to be repeated or whether a different medical imaging study would be better to resolve the clinical question**

## Diagnostic Radiology: Core EPA #6

### Advising physicians and other health care providers on the selection and timing of diagnostic radiology studies and procedures

#### Key Features:

- This EPA includes gathering the needed clinical information about the request and synthesizing clinical data with results of other investigations to develop an understanding of the clinical question and make recommendations about selection, sequence and/or timing of further investigation.
- Examples include: recommending a follow-up study/procedure; altered renal function prohibiting the requested examination; incorrect or inappropriate study/procedure ordered based on clinical history; expediting the timing of a radiology study/procedure based on history or findings; conveying the urgency of the need for a radiology study/procedure; and working with the clinician to develop a management plan based on the imaging finding.
- The observation of this EPA is based on the supervisor directly observing a single interaction between the resident and a referring physician/team - in person, via telephone or in a simulated scenario.

#### Assessment Plan:

Direct observation by staff radiologist

Use Form 1. Form collects information on:

- Modality: CT; MRI; radiography; ultrasound
- Body region: abdomen/pelvis; breast; chest; MSK; neuro
- Setting: clinical; simulation

Collect 3 observations of achievement

- Different modalities and body regions
- No more than 1 in simulation
- At least 3 different assessors

#### CanMEDS Milestones:

- 1 COL 1.1** Establish positive relationships with other members of the health care team
- 2 ME 2.2** Gather patient information from another health professional
- 3 ME 2.2** Correlate prior investigations, including the results of relevant laboratory investigations and imaging
- 4 ME 2.2** Integrate and synthesize patient information to establish the clinical question
- 5 ME 2.4** Advise referring physicians on the most appropriate selection, sequence and/or timing of investigation(s)

- 6 ME 2.4 Identify when a study and/or procedure is not appropriate**
- 7 COL 1.3 Convey information to clinicians in a manner that enhances patient management**
- 8 COL 1.3** Support clinical colleagues in the development and implementation of a management plan
- 9 HA 1.1** Respond to individual patient diagnostic needs and issues as part of patient care



## Diagnostic Radiology: Core EPA #7

### Protocolling requests for medical imaging

#### Key Features:

- This EPA focuses on the work of a diagnostic radiologist to review imaging requests and plan imaging studies.
- This includes gathering information about the patient condition and purpose of the request, triaging the urgency of the request, selecting the appropriate protocol and demonstrating attention to radiation, contrast and patient safety, as well as stewardship of imaging resources.
- At this stage, this EPA includes adult and pediatric patients, in any clinical setting, and includes patient-specific factors that impact upon imaging such as impaired renal function, contrast allergy and pregnancy.

#### Assessment Plan:

Review of a batch of requests by staff radiologist, fellow, or TTP resident, which may include input from technologist

Use Form 1. Form collects information on:

- Body region (select all that apply): abdomen/pelvis; cardiothoracic; head and neck; MSK; neuro; soft tissue; spine; vascular; other
- Modality (select all that apply): CT; MRI; nuclear medicine; radiography; ultrasound; vascular; other
- Number of requests in batch (write in):
- Number of requests that need modifications (write in):

Collect at least 12 observations of achievement

- At least 3 batches of abdomen/pelvis requests
- At least 3 batches of cardiothoracic requests
- At least 3 batches of MSK requests
- At least 3 batches of neuro requests
- At least 3 batches with requests that needed modification
- At least 4 batches that include CT requests
- At least 4 batches that include MRI requests
- At least 5 different assessors

#### CanMEDS Milestones:

- 1 ME 2.2 Gather and synthesize patient information to establish the clinical question**
- 2 ME 2.2 Identify patient factors that may affect the choice of imaging protocol**
- 3 ME 2.2 Correlate prior investigations, including the results of relevant laboratory investigations and imaging**

- 4 ME 2.4 Identify when a study and/or procedure is not appropriate**
- 5 ME 3.4 Determine whether the patient requires sedation and/or pre-treatment for prevention of contrast reactions**
- 6 ME 2.2 Minimize exposure to contrast agents and radiation**
- 7 ME 3.4 Modify and/or customize the request as needed**
- 8 ME 3.4 Determine the priority of the request and triage the study**
- 9 COM 5.1 Document the plan for the imaging study or procedure**
- 10 COL 1.2 Communicate effectively with technical staff about the urgency and/or customization of diagnostic radiology studies/procedures**
- 11 L 2.1 Allocate imaging resources judiciously, recognizing redundancies and demonstrating awareness and stewardship of medical imaging resources**

## Diagnostic Radiology: Core EPA #8

### Discussing imaging findings with patients and their families

#### Key Features:

- The focus of this EPA is the application of communication skills to clearly and compassionately convey imaging findings, including a diagnosis and the limits of the findings, to patients and families.
- This EPA may be observed in any setting, including simulation, but is most likely to be relevant in breast imaging, fluoroscopy, obstetric, pediatric, interventional, and ultrasound settings.

#### Assessment Plan:

Direct observation by radiologist, which may include input from other health professionals

Use Form 1. Form collects information on:

- Setting: clinical; simulation

Collect 3 observations of achievement

- No more than 1 in simulation setting
- At least 3 different assessors

#### CanMEDS Milestones:

- 1 COM 1.1** Demonstrate empathy, respect and compassion
- 2 COM 3.1** Provide accurate information
- 3 COM 3.1** Use plain language and avoid medical jargon
- 4 COM 3.1** Verify the patient's and/or family's understanding
- 5 COM 4.3** Answer questions from the patient and/or family
- 6 COM 4.1** Communicate in a manner that is respectful, compassionate, non-judgmental, and culturally aware
- 7 COM 1.5** Recognize when strong emotions (such as anger, fear, anxiety, or sadness) are impacting an interaction and respond appropriately
- 8 COM 1.4** Respond to patients' non-verbal communication and use appropriate non-verbal behaviours to enhance communication
- 9 COM 1.5** Establish boundaries as needed in emotional situations

## Diagnostic Radiology: Core EPA #9

### Participating in interdisciplinary rounds

#### Key Features:

- This EPA focuses on the role of the diagnostic radiologist as a participant in and contributor to interdisciplinary clinical decision-making.
- This EPA includes preparing and presenting cases, including a review of relevant literature, responding to questions from the interdisciplinary group and communicating effectively in this setting.
- At this stage, the resident is not yet expected to be the sole source of Diagnostic Radiology expertise for the rounds. This is an expectation of the Transition to Practice stage.

#### Assessment Plan:

Direct observation by staff radiologist, which may include input from other health professionals

Use Form 1. Form collects information on:

- Type of rounds (write in):

Collect 2 observations of achievement

#### CanMEDS Milestones:

- 1 ME 1.4 Synthesize cases for discussion at interdisciplinary rounds**
- 2 S 2.4 Present the information in an organized manner**
- 3 S 2.4 Use audiovisual aids effectively**
- 4 S 3.3 Critically evaluate the literature**
- 5 COL 1.3 Convey information to clinicians in a manner that enhances patient management**
- 6 COL 1.3 Encourage discussion, questions, and interaction relevant to the case**
- 7 COL 1.3 Support clinical colleagues in the development and implementation of a management plan**
- 8 COL 1.3 Participate effectively at interdisciplinary rounds**
- 9 HA 1.1 Respond to individual patient diagnostic needs and issues as part of patient care**
- 10 P 1.1 Behave in a professional manner**

## Diagnostic Radiology: Transition to Practice EPA #1

### Managing a radiology service

#### Key Features:

- This EPA focuses on the diagnostic radiologist's role in the overall delivery of safe patient care in a medical imaging department, maintaining the volume and quality of the work.
- This includes all aspects of the work of a diagnostic radiologist: interpreting and reporting a case load of imaging studies, providing consultation, performing/supervising procedures, triaging patients, protocolling requests, attending clinical rounds, etc.
- This EPA also includes teaching and providing feedback to junior learners, as well as working effectively with the other health care professionals in the department as well as referring services.
- Observation of this EPA should occur in at least two different medical imaging settings or services.
- The observation of this EPA is based on a day of clinical activity, and may include daytime as well as after-hours work.

#### Assessment Plan:

Direct and indirect observation by staff radiologist, with input from technologists

Use Form 1. Form collects information on:

- Complexity of day: low; medium; high
- Includes after-hours call: no; yes
- Body region (select all that apply): abdomen/pelvis; cardiothoracic; head and neck; MSK; neuro; soft tissue; spine; vascular; other
- Modality (select all that apply): CT; MRI; nuclear medicine; radiography; ultrasound; vascular; other

Collect 5 observations of achievement

- At least 2 medium or high complexity days
- At least 1 that includes after-hours call
- At least 2 different modalities or body regions
- At least 2 different assessors

#### CanMEDS Milestones:

**1 ME 1.5 Carry out professional duties in the face of multiple competing demands**

**2 ME 2.1 Prioritize requests for diagnostic radiology studies**

**3 COL 1.2 Coordinate scheduling of cases with technical and other staff**

**4 COL 1.2 Guide technical staff to resolve clinical or imaging challenges**

- 5 ME 3.5 Perform procedures in a skilful and safe manner**
- 6 ME 3.4 Interpret diagnostic radiology studies/procedures**
- 7 COM 5.1 Provide reports of the caseload of diagnostic radiology studies within an acceptable time frame**
- 8 L 4.1 Set priorities and manage time to fulfil diverse responsibilities**
- 9 L 4.1 Integrate supervisory and teaching responsibilities into the overall management of the service**
- 10 S 3.4 Integrate best evidence and clinical expertise**
- 11 P 1.1 Work within personal limits, seeking assistance as needed**

## Diagnostic Radiology: Transition to Practice EPA #2

### Developing plans for patients for whom there is uncertainty in diagnosis and/or management

#### Key Features:

- This EPA focuses on the investigation and/or management of patients for whom there is uncertainty in diagnosis and/or uncertainty in determining optimal treatment.
- This EPA includes the interpretation of available imaging, synthesis with other clinical and laboratory information, integration of opinions from other radiologists and other physicians, as well as effective communication of uncertainty to the patient/family and/or the referring physician.
- This EPA may require scholarly review of the literature and/or consultation with external experts.

#### Assessment Plan:

Case discussion and/or review of images with staff radiologist

Use Form 1. Form collects information on:

- Description of case (write in):
- Complexity of case: low; moderate; high

Collect 3 observations of achievement

- The cases for decisions regarding achievement must be moderate or high complexity
- At least 2 assessors

#### CanMEDS Milestones:

- 1 P 1.1** Identify limits in their own expertise
- 2 COL 1.3** Gather and/or clarify the indication for testing and/or clinical information with the referring physician
- 3 ME 2.2** Gather additional clinical information from the medical record
- 4 ME 2.2** Integrate findings from prior investigations
- 5 COL 1.3** Consult with colleagues with different expertise
- 6 COL 1.3** Incorporate the opinions and perspectives of other physicians
- 7 S 3.4** Critically appraise relevant medical literature to make evidence-informed decisions
- 8 ME 3.4** Provide an interpretation of the medical imaging study/procedure
- 9 ME 3.4** Provide recommendations that may clarify the diagnosis, such as other investigations or follow-up testing

**10 COM 5.1 Articulate complexities and/or diagnostic uncertainty in the report, such as limitations and areas of uncertainty**



## **Diagnostic Radiology: Transition to Practice EPA #3**

### **Contributing expertise in interdisciplinary rounds**

#### Key Features:

- This EPA builds on the knowledge and skills demonstrated at the Core stage.
- This EPA focuses on the role of the diagnostic radiologist as the authority providing radiologic expertise to the team discussion, advocating for the patient and demonstrating professional behaviour.
- The observation of this EPA is based on one patient/case presentation (i.e., not on the entire meeting).

#### Assessment Plan:

Direct observation by staff radiologist or another member of the interprofessional team

Use Form 1. Form collects information on:

- Type of rounds (write in):
- Role of observer: diagnostic radiologist; treating physician/surgeon; other health care professional

Collect 4 observations of achievement:

- At least 2 different types of rounds

#### CanMEDS Milestones:

- 1 ME 1.4 Present and discuss cases effectively in the role of a consultant in Diagnostic Radiology**
- 2 S 3.3** Critically evaluate the literature
- 3 S 3.4 Integrate best evidence and clinical expertise**
- 4 COL 1.3 Convey information to clinicians in a manner that enhances patient management**
- 5 HA 1.1 Respond to individual patient diagnostic needs and issues as part of patient care**
- 6 COL 1.3 Support clinical colleagues in the development and implementation of a management plan**
- 7 COL 2.2** Facilitate the development of consensus when there are differences in recommendations provided by other health care professionals
- 8 L 2.1** Allocate health care resources for optimal patient care

**9 P 1.1 Behave in a professional manner**

## Diagnostic Radiology: Transition to Practice EPA #4

### Conducting scholarly work relevant to Diagnostic Radiology

#### Key Features:

- This EPA includes using appropriate methods, analyzing results, critically reflecting on the findings and disseminating results. It may include obtaining grant funding and preparing a manuscript for publication.
- This may include basic or clinical science related to diagnostic radiology, medical education research or quality improvement projects.
- The achievement of this EPA may be based on preparation of a manuscript suitable for submission to a peer-reviewed journal, or presentation of the project at a peer-reviewed local, regional, provincial, national or international scientific meeting.

#### Assessment Plan:

Review of submitted manuscript and/or direct observation of presentation by research supervisor

Use Form 4

Collect 1 observation of achievement

#### CanMEDS Milestones:

- 1 S 4.4** Generate focused questions for scholarly investigation
- 2 S 3.3** Critically evaluate the literature
- 3 S 4.5** Summarize the findings of a literature review
- 4 S 4.4** Select appropriate methods of addressing a given scholarly question
- 5 S 4.2** Identify ethical principles in research, including patient privacy concerns
- 6 S 4.4** Collect data for a scholarly project
- 7 S 4.4** Perform data analysis
- 8 S 4.4** Interpret and integrate data in the context of existing literature
- 9 S 4.5** Disseminate the findings of scholarly activity, in written or oral form

## Diagnostic Radiology: Transition to Practice EPA #5

### Planning and completing personalized training experiences aligned with career plans and/or specific learning needs

#### Key Features:

- This EPA allows the resident to individualize training to prepare for fellowship training, prepare for practice in a specific setting and/or a setting requiring distinct skills, or act on performance gaps identified through self-assessment or by the competence committee.
- This EPA may be used for any structured training experience: clinical or academic. Examples include: pursuing fellowship-specific clinical experiences; developing a scholarly focus.
- The assessment of this EPA is based on the achievement of outcomes identified by the resident and approved by the program director/program committee. These outcomes must be SMART (specific, measurable, achievable, relevant, timely).

#### Assessment Plan:

Review of resident's plan and its outcome by supervisor, academic advisor or program director

Use Form 4

Collect 1 observation of achievement

#### CanMEDS Milestones:

- 1 P 2.1** Demonstrate a commitment to maintaining and enhancing competence
- 2 S 1.2** Interpret data on personal performance to identify opportunities for learning and improvement
- 3 L 4.2** Examine personal interests and career goals
- 4 S 1.1** Define learning needs related to personal practice and/or career goals
- 5 S 3.1** Generate focused questions that address knowledge gaps
- 6 S 1.1** Create a learning plan that is feasible, includes clear deliverables and a plan for monitoring ongoing achievement
- 7 S 1.1** Identify resources required to implement a personal learning plan
- 8 L 4.2** Adjust educational experiences to gain competencies necessary for future practice