This document outlines a model residency curriculum for training in emergency radiology (ER). This is intended as an ideal curriculum to produce comprehensively trained emergency radiologists for academic and private practice with a breadth of training exposure to become expert diagnosticians and thought-leaders in the field. If a specific fellowship does not offer certain components, it is possible and suggested to draw on external educational resources to augment expertise in deficient areas.

**Traumatic**

1. CNS
   a. Intracranial injury
      i. Subdural and epidural hematoma
      ii. Subarachnoid hemorrhage
      iii. Cortical contusion
      iv. Diffuse axonal injury
   b. Blunt and penetrating cerebrovascular injury
   c. Calvarial and skull base fractures
   d. Spinal trauma
      i. Spinal cord contusion/transection
      ii. Spinal epidural hematoma
      iii. Nerve root avulsion

2. Spine
   a. Cranio-cervical junction and cervical spine
      i. Occipital condyle fracture
      ii. Atlanto-occipital dislocation/subluxation
      iii. Atlanto-axial rotary fixation
      iv. Jefferson fracture
      v. Dens fracture
      vi. Hangman’s fracture
      vii. Flexion or extension tear drop fracture
      viii. Facet dislocation
      ix. Acute ligamentous injury
   b. Thoraco-lumbar spine
      i. Compression fracture
      ii. Burst fracture
      iii. Chance fracture
      iv. Complex fracture-dislocation
      v. Pathological fracture

3. Head and Neck (non-CNS)
   a. Maxillofacial fractures (e.g. LeFort fractures)
   b. Orbit
      i. Ocular injuries
         (1) Globe rupture
         (2) Lens dislocation
         (3) Vitreous hemorrhage
(4) Subchoroidal hemorrhage
(5) Retrobulbar hematoma
  ii. Extraocular muscle herniation/entrapment
4. Thoracic
  a. Pulmonary – contusion, laceration, hematoma
  b. Pleural - Pneumothorax, hemothorax
  c. Cardiac and pericardial injury – mediastinal hemorrhage, pneumomediastinum
  d. Diaphragmatic injury
  e. Blunt and penetrating injury to the airway and esophagus
  f. Rib fractures
  g. Sternal fracture
5. Abdominal
  a. Solid organ trauma: hepatic, splenic, pancreatic, renal and other organs, with familiarity with the American Association of Surgeons of Trauma (AAST) and CT-based classification system.
  b. Traumatic bowel and mesenteric injury
  c. Hemoperitoneum, pneumoperitoneum, retroperitoneal hemorrhage
  d. Bladder, urinary collecting system, and ureteral injury
  e. Traumatic abdominal wall hernias and diaphragmatic injuries
  f. Obstetric and non-obstetric female pelvic emergencies
    i. Uterine trauma
    ii. Fetoplacental trauma
  g. Male pelvic emergencies
    i. Urethral and penile trauma
    ii. Scrotal and testicular trauma
6. Musculoskeletal
  a. Fractures and dislocations: focus on subtle or missed emergent fractures (e.g., Lisfranc, Segond fractures) and supplemental radiographic views or other imaging
  b. Familiarity with classification systems where clinically appropriate
7. Vascular
  a. Aortic injury
  b. Peripheral vascular injury
  c. Contained (pseudoaneurysm and AV fistula) and uncontained (active bleeding) vascular injury

Non-traumatic
1. CNS
  a. Cerebrovascular ischemia
    i. Arterial infarction
    ii. Venous infarction
  b. Intracranial hemorrhage
  c. Intracranial neoplasm
  d. Intracranial herniation patterns
e. Intracranial infections
   i. Meningitis
   ii. Encephalitis
   iii. Abscess/cerebritis
   iv. Subdural empyema
f. Dural sinus thrombosis
g. PRES
h. Pituitary apoplexy
   i. Spinal cord emergencies
      i. Cord compression
      ii. Cauda equina syndrome

2. Spine
   i. Diskitis/osteomyelitis
   ii. Epidural abscess
   iii. Disk herniation

3. Head and Neck (non-CNS)
   a. Paranasal sinuses
      i. Acute or chronic sinusitis
      ii. Aggressive fungal sinusitis
      iii. Complications of sinusitis
         (1) Orbital cellulitis
         (2) Orbital subperiosteal abscess
         (3) Osteomyelitis
         (4) Epidural abscess
         (5) Subdural empyema
         (6) Cavernous sinus thrombosis
   b. Soft tissues of the face
      i. Orbital cellulitis
      ii. Parotitis
         iii. Submandibular sialoadenitis
      iv. Ludwig angina
   c. Odontogenic infections
   d. Neck
      i. Retropharyngeal and prevertebral abscess/edema
      ii. Tonsillitis and tonsillar/peritonsillar abscess
      iii. Epiglottitis
      iv. Croup
      v. Lymphadenitis and suppurative adenopathy
      vi. Jugular thrombophlebitis
   e. Ear
      i. Otitis externa and media
      ii. Cholesteatoma
      iii. Otomastoiditis
Recommended Emergency Radiology Curriculum for Residents

iv. Apical petrositis

4. Thoracic
   a. Pulmonary infection and inflammation, including diseases of the airways, parenchyma, and pleura
   b. Pulmonary edema
   c. Thoracic vascular emergencies (e.g., aortic aneurysm, pulmonary embolism)
   d. Primary and metastatic thoracic malignancy; familiarity with thoracic oncologic emergencies
   e. Foreign body aspiration

5. Abdominal
   a. Gastrointestinal inflammation, infection, and hemorrhage
   b. Gastric, midgut, and colonic volvulus
   c. Bowel obstruction
   d. Bowel ischemia (etiologies and patterns of disease)
   e. Epiploic appendagitis, omental infarct
   f. Pancreatitis
   g. Gallbladder and biliary emergencies
   h. Urologic infection and calculous disease
   i. Ascites, peritonitis, intra-abdominal abscess
   j. Abdominal wall hernias
   k. Acute and chronic liver parenchymal and vascular disease
   l. Abdominopelvic malignancies
   m. Obstetric and non-obstetric female pelvic emergencies
      i. Subchorionic hemorrhage
      ii. Placenta previa
      iii. Placenta abruption and hemorrhage
      iv. Endometritis
      v. Spontaneous abortion
      vi. Fetal demise
      vii. Ectopic pregnancy
      viii. Ovarian cystic disease, ovarian mass
   ix. Ovarian torsion
   x. Pelvic inflammatory disease
   n. Male pelvic emergencies
      i. Testicular torsion
      ii. Epididymitis, orchitis
      iii. Acute fluid collections – hydrocele, hematocele, pyocele
      iv. Testicular infarction
      v. Abscess
      vi. Fournier’s gangrene

6. Musculoskeletal
   a. Bone and joint infection
   b. Bone and joint prosthetic and peri-prosthetic complications
c. Cellulitis and necrotizing fasciitis
d. Soft-tissue abscess
e. Compartment syndrome
f. Muscle and ligamentous injuries

7. Vascular
   a. Deep venous thrombosis
   b. Thrombophlebitis
   c. Peripheral arterial emergencies (e.g., thrombosis)

8. Breast imaging
   a. Mastitis and breast abscess
   b. Breast implant rupture

Advanced imaging interpretive skills (*may be part of other rotations in residency)
1. Understanding mechanisms of blunt trauma
2. Penetrating injuries, including ballistic and stab injuries (e.g., ballistic pressure wave theory)
3. Optimal exam protocoling for polytrauma
4. CT cystography (trauma): indications and technical factors
5. Extremity CTA
6. Head and neck CTA*
7. MRI protocoling and interpretation*
   a. Brain and spine MRI
   b. Musculoskeletal MRI for osteomyelitis, or radiographically occult fracture
   c. Abdominal MRI for appendicitis in the pregnant patient
8. Emergent nuclear medicine*
   a. Ventilation and perfusion scintigraphy
   b. Hepatobiliary scintigraphy
   c. Tagged-RBC scintigraphy for GI bleed
   d. Osteomyelitis imaging
9. Coronary CTA*
10. Dual-energy CT (DECT), if available

Non-interpretive skills
1. Awareness of imaging workflow in the ED
2. Ability to triage imaging appropriately in times of high volume
3. Wellness and burnout
4. Time management and work-life integration

Quality and safety
1. IV contrast reaction management
2. IV infiltration management
3. Radiation dose optimization
4. MRI safety
5. Managing imaging of pregnant and pediatric patients in the ED