Limited Scope of Practice in Radiography

The purpose of the ~~Limited Scope of Practice in Radiography e~~Examination requirement, which is developed and administered by The American Registry of Radiologic Technologists (ARRT) on behalf of state licensing agencies, is to assess whether individuals obtained the knowledge and cognitive skills underlying the intelligent performance of the tasks typically required of state operators of radiographic equipment used to radiograph selected anatomic regions (chest, extremities, etc.) for practice at entry level.

ARRT administers the examination to state approved candidates under contractual arrangement with the state and provides the results directly to the state. This examination is not associated with any type of certification and registration by the ARRT. ARRT administers this examination on a computer at a standardized testing center.

~~The knowledge and skills covered by the examination were~~ARRT determined ~~determined~~ the tasks that entry-level state operators typically perform by administering a comprehensive practice analysis survey to a nationwide sample of radiographers. From this survey, ~~and adopting a subset of the~~a list of tasks ~~developed~~ known as the task inventory was adopted for the discipline.~~radiography task inventory, as the limited scope task inventory.~~ The *T~~t~~ask l~~I~~nventory for Limited Scope of Practice in Radiography* appears in Attachment ~~C~~ B of this document.

The *Examination C~~c~~ontent S~~s~~pecifications for ~~the limited~~ Limited S~~s~~copeof Practice in Radiography* ~~examination~~ and attached content outline identify the knowledge areas underlying performance of the tasks on the *Task Inventory for L~~l~~imited S~~s~~cope of Practice in Radiography* ~~task inventory.~~ Every content category ~~can be linked~~ links to one or more ~~activities~~ tasks on the task inventory.

It is the philosophy of the ARRT that individuals licensed in limited scope radiography possess the same knowledge and cognitive skill, in their specific area of radiography, as radiographers. The modules covered by the examination are outlined below. Subsequent pages describe in detail the topics covered within each module. All candidates take the CORE module of the examination and one or more PROCEDURE modules, depending on the type of license for which they have applied.

Core Module	Number of Scored Questions[1]	Testing Time
Patient Care	16~~8~~	
Patient Interactions and Management (16~~8~~)		
Safety	42~~0~~	
Radiation Physics and Radiobiology (17~~2~~)		
Radiation Protection (25~~8~~)		
Image Production	42	
Image Acquisition and Evaluation (20)		
Equipment Operation and Quality Assurance (22)		
Total for Core Module	100	1 hr, 55 min

Procedure Modules

1. Chest	20	25 min
2. Extremities	25	30 min
3. Skull, ~~/~~Sinuses, and facial bones	20	25 min
4. Spine	25	30 min
5. Podiatric	20	25 min

The core module includes an additional 15 unscored (pilot) questions. Each of the procedure modules has five additional unscored questions.

Patient Care

1. Patient Interactions and Management

A. Ethical and Legal Aspects
1. patients' rights
   a. consent (e.g.,* informed, oral, implied)
   b. confidentiality (HIPAA)
   c. American Hospital Association (AHA) Patient Care Partnership ~~(Patients' Bill of Rights)~~
      1. privacy
      2. extent of care (e.g., DNR)
      3. access to information
      4. living will, health care proxy, advanced directives
      5. research participation
2. legal issues
   a. verification (e.g., patient identification, comparison of ~~are~~ order to clinical indication)
   b. common terminology (e.g., battery, negligence, malpractice, beneficence)
   c. legal doctrines (e.g., respondeat superior, res ipsa loquitur)
   d. restraints versus positioning aids used to ~~prevent~~ eliminate motion artifact
   e. manipulation of electronic data (e.g., exposure indicator, processing algorithm, brightness and contrast, cropping or masking off anatomy)
   f. documentation (e.g., changes to order, medical event)
3. Professional Ethics

B. Interpersonal Communication
1. modes of communication
   a. verbal ~~/written~~
   b. nonverbal (e.g., eye contact, touching)
   c. written
2. challenges in communication
   a. interactions with others
      1. language barriers
      2. cultural and social factors
      3. physical, sensory, or cognitive impairments
      4. age
      5. emotional status, acceptance of condition (e.g., ~~stage of grief~~ mental health state)
   b. explanation of medical terms
   c. strategies to improve understanding
3. patient education
   a. ~~(e.g.,~~ explanation of current procedure (e.g., purpose, length of time, radiation dose)
   b. patient scheduling (e.g., length of procedure, patient's condition, age and preparation for the procedure)
   c. respond to inquiries about other imaging modalities (e.g., differences, types of radiation)

C. ~~Ergonomics~~ Physical Assistance and Monitoring
1. body ~~mechanic~~ergonomics ~~s~~ (e.g., balance, alignment, movement)
   a. patient transfer techniques
   b. safe patient handling devices (e.g., transfer board, patient lift, gait belt)
2. assisting patients with medical equipment ~~(e.g., oxygen delivery systems, urinary catheters)~~
   a. infusion catheters and pumps
   b. oxygen delivery systems
   c. other (e.g., nasogastric tubes, urinary catheters, tracheostomy tubes)
3. patient monitoring and documentation
   a. vital signs (e.g., blood pressure, pulse, respiration rate)
   b. physical signs and symptoms (e.g., motor control, severity of injury)
   c. fall prevention
   d. patient comfort and modesty

D. Medical Emergencies
1. allergic reactions (e.g., ~~contrast media~~, latex)
2. cardiac or respiratory arrest (e.g., CPR, AED)
3. physical injury or trauma
4. other medical disorders (e.g., seizures, diabetic reactions)
5. communication of critical findings to health care team

*"e.g." indicates examples of the topics covered, but is not a complete list.

Patient Care (continued)

E. Infection Control
   1. chain of infection (cycle of infection)
      a. pathogen
      b. reservoir
      c. portal of exit
      d. mode of transmission
         1. direct
            a. droplet
            b. direct contact
         2. indirect
            a. airborne
            b. vehicle-borne (fomite)
            c. vector-borne (mechanical or biological)
      e. portal of entry
      f. susceptible host
   2. asepsis
      a. equipment disinfection
      b. ~~equipment sterilization~~
      c. medical aseptic technique
      d. ~~sterile technique~~
   3. CDC Standard Precautions
      a. hand hygiene
      b. use of personal protective equipment (PPE) (e.g., gloves, gowns, masks)
      c. safe handling of contaminated equipment and ~~/~~surfaces
      d. disposal of contaminated materials
         1. linens
         2. ~~needles~~
         3. patient supplies
         4. blood and body fluids
   4. transmission-based precautions
      a. contact
      b. droplet
      c. airborne
   5. additional precautions
      a. neutropenic precautions (reverse isolation)
      b. healthcare-associated (nosocomial) infections

F. Handling and Disposal of Toxic or Hazardous Material
   1. types of materials
      a. chemicals
      b. disinfectants
   2. safety data sheet ~~(material safety data sheet)~~

Safety

1. Radiation Physics and Radiobiology

A. Principles of Radiation Physics
   1. ~~x~~X-ray production
      a. source of free electrons (e.g., thermionic emission)
      b. acceleration of electrons
      c. focusing of electrons
      d. deceleration of electrons
   2. target interactions
      a. bremsstrahlung
      b. characteristic
   3. X~~x~~-ray beam
      a. frequency and wavelength
      b. beam characteristics
         1. quality
         2. quantity
         3. primary versus remnant (exit)
      c. inverse-~~-~~square law
      d. fundamental properties (e.g., travel in straight lines, ionize matter)
   4. photon interactions with matter
      a. photoelectric
      b. Compton
      c. coherent (classical)
      d. attenuation by various tissues
         1. thickness of body part
         2. type of tissue (atomic number)

B. Biological Effects of Radiation
   1. SI units of measurement (NCRP Report #184~~160~~)
      a. absorbed dose (Gy)
      b. dose equivalent (Sv)
      c. exposure (C/kg)
      d. effective dose (Sv)
      e. air kerma (Gy)
   2. radiosensitivity
      a. dose-response relationships (e.g., LET, RBE)
      b. relative tissue radiosensitivities ~~(e.g., LET, RBE)~~
      c. cell survival and recovery (LD_{50})
      d. oxygen effect
   3. somatic effects
      a. cells
      b. tissue (e.g., eye, thyroid, breast, skin, marrow, gonad~~al~~)
      c. embryo and fetus
      d. carcinogenesis
      e. early versus late or acute versus chronic
      f. deterministic (tissue reactions) versus stochastic
      g. short-term versus long-term exposure
      ~~g~~h. acute radiation syndromes
         1. hemopoietic
         2. gastrointestinal (GI)
         3. central nervous system (CNS)

~~(Safety continues on the following page.)~~

Safety (continued)

2. Radiation Protection

A. Minimizing Patient Exposure and Repeats
1. exposure factors
   a. kVp
   b. mAs
   c. automatic exposure control (AEC)
2. beam restriction
   a. purpose of primary beam restriction
   b. types (e.g., collimators)
3. patient considerations
   a. positioning
   b. communication
   c. pediatric
   d. body habitus ~~morbid obesity~~
   e. pregnancy
4. filtration
   a. effect on skin and organ exposure
   b. effect on average beam energy
   c. NCRP recommendations (NCRP Report #102, minimum filtration in useful beam)
5. radiographic dose documentation
6. ~~image receptors~~ digital detector (e.g., DQE, exposure latitude)
7. grids
8. dose area product (DAP) meter
9. resources (e.g., Image Wisely®, Image Gently®)

B. Personnel Protection (ALARA)*
1. sources of radiation exposure
   a. primary X~~x~~-ray beam
   b. secondary radiation
      1. scatter
      2. leakage
   c. patient as source
2. basic methods of protection
   a. time
   b. distance
   c. shielding (e.g., need and appropriate use)
3. protective devices
   a. types (e.g., aprons, barriers)
   b. attenuation properties
   c. minimum lead equivalent (e.g., apron, accessories) (NCRP Report #102)
4. radiation exposure and monitoring
   a. dosimeters
      1. types (e.g., TLD, OSL, DIS)
      2. proper use
   b. ~~NCRP~~ recommendations and regulations for personnel monitoring (NCRP Report #180, 21CFR)~~#116)~~
      1. occupational exposure
      2. public exposure
      3. embryo and~~/~~fetus exposure
      4. dose equivalent limits
      5. evaluation and maintenance of personnel dosimetry records

* Note: Although it is the responsibility of the individual licensed in limited scope radiography to apply radiation protection principles to minimize bioeffects for both patients and personnel, the ALARA concept is specific to personnel protection and is listed only for that section.

Image Production

1. Image Acquisition and Evaluation

A. Factors Affecting Radiographic Quality
(X indicates topics covered on the examination.)

	1. Receptor Exposure	2. Image Contrast	3. Subject Contrast	4~~2~~. Spatial Resolution	5~~3~~. Distortion
a. mAs	X				
b. kVp	X	X	X		
c. OID		X		X	X
d. SID	X			X	X
e. focal spot size				X	
f. grids*	X	X			
g. tube filtration ~~f.~~	X	X	X		
~~g.~~h. beam restriction	X	X			
~~h.~~i. motion				X	
~~i.~~j. anode heel effect	X				
~~j.~~k. patient factors (size, pathology)	X	X	X	X	X
~~k.~~l. angle (tube, part, or receptor)	X			X	X

B. Technique Charts
1. anatomically programmed technique
2. fixed versus variable kVp
3. special considerations
   a. casts
   b. pathologic factors
   c. age (e.g., pediatric, geriatric)
   d. ~~body mass index (BMI)~~body habitus
   e. grids
   f. OID

C. Automatic Exposure Control (AEC)
1. effects of changing exposure factors on radiographic quality
2. phototimer cells
3. anatomic alignment
4. exposure adjustment (e.g., density, +1 or −1)

~~C~~D. Digital Imaging Characteristics
1. spatial resolution
   a. pixel characteristics (e.g., size, pitch)
   b. detector element (DEL) (e.g., size, pitch, fill factor)
   ~~c.~~ CCD, CMOS (e.g., size, pitch)
   ~~d~~c. Nyquist frequency~~sampling frequency (CR~~
   d. matrix size~~)~~
   e. modulation transfer function (MTF)
2. contrast resolution
   a. bit depth
   b. detective quantum efficiency (DQE)
   c. grids (e.g., focused, virtual)
3. image signal
   a. dynamic range
   b. quantum noise (quantum mottle)
   c. signal-to-noise ratio (SNR)

~~D~~E. Image Identification
1. methods (e.g., radiographic, electronic)
2. legal considerations (e.g., patient data, examination data)

~~E~~F. Criteria for Image Evaluation
1. exposure indicator
2. quantum noise (quantum mottle)

3. gross exposure error
   (e.g., loss of contrast, saturation)
4. contrast (e.g., subject, image)
~~4~~5. spatial resolution
~~5~~6. distortion (e.g., size, shape)
~~6~~7. identification markers
   (e.g., anatomical side, patient, date)
~~7~~8. image artifacts
~~8. radiation fog (CR)~~

~~(Image Production continues on the following page.)~~

Image Production (continued)

2. Equipment Operation and Quality Assurance

A. Imaging Equipment
1. ~~x~~X-ray generator, transformers, and rectification system
   a. basic principles
   b. phase, pulse, and frequency
   c. tube loading
2. components of radiographic unit (fixed or mobile)
   a. operating console
   b. ~~x~~X-ray tube construction
      1. electron source
      2. target materials
      3. induction motor
      4. filtration
   c. automatic exposure control (AEC)
      1. ~~radiation detectors~~phototimer cells
      2. back-up timer
      3. exposure adjustment (e.g., density, +1 or -~~2~~1)
      4. minimum response time
   d. manual exposure controls
   e. digital detector ~~image receptors~~
      1~~. computed radiography~~
      ~~a. plate (e.g., photo-stimulable phosphor (PSP))~~
      ~~b. plate reader~~
      ~~2. digital radiography (DR)~~
         ~~a~~1. direct conversion (e.g., a-Se)
         ~~b~~2. indirect conversion (e.g., a-SI, CCD)
         ~~1. amorphous silicon (a-Si)~~
         ~~2. charge coupled device (CCD)~~
         ~~3. complementary metal oxide semiconductor (CMOS)~~
   f. beam restriction
3. accessories
   a. stationary grids
   b. virtual grids
   ~~b~~c.Bucky assembly
   ~~c. compensating filters~~

B. Image Processing and Display
1. raw data (pre-processing)
   a. analog-to-digital converter (ADC)
   b. quantization
   c. corrections (e.g., rescaling, gain calibration,~~flat fielding~~, dead pixel correction)
   d. histogram

2. corrected data for processing
   a. grayscale
   b. edge enhancement
   c. equalization
   d. smoothing
3. data for display
   a. values of interest (VOI)
   b. look-up table (LUT)
4. post-processing
   a. brightness (e.g., window level)
   b. contrast (e.g., window width)
   c. region of interest (ROI)
   d. electronic cropping or masking
   e. stitching
5. display monitors
   a. viewing conditions (e.g., viewing angle, ambient lighting)
   b. spatial resolution (e.g., pixel size, pixel pitch)
   c. brightness and contrast resolution
6. ~~imaging~~ informatics
   a. information systems (e.g., HIS, RIS, EMR, EHR)
   b. networking
      1. PACS, MIMPS
      2. DICOM

3. security and confidentiality
4. teleradiology (e.g., third party coverage)

   c. downtime procedures

C. Quality Control of Imaging Equipment and Accessories
1. beam restriction
   a. light field to radiation field alignment
   b. central ray alignment
2. recognition and reporting of malfunctions
3. digital imaging receptor systems
   a. maintenance (e.g., detector calibration, ~~plate reader calibration~~)
   b. QC tests (e.g., ~~erasure thoroughness,~~ detector uniformity~~plate uniformity,~~ spatial resolution)
   c. display monitor quality assurance (e.g., grayscale standard display function, luminance)
4. shielding accessories (e.g., testing lead apron, gloves)

Procedures

The specific positions and projections within each anatomic region that may be covered on the examination are listed in *Attachment A*. ~~A guide to positioning terminology appears in *Attachment B*.~~

PROCEDURE MODULE [1]	# QUESTIONS PER MODULE [2]
1. Chest	
A. Routine	16
B. Other	4
TOTAL	**20**
2. Extremities	
A. Lower (toes, foot, calcaneus, ankle, tibia and~~/~~ fibula, knee and~~/~~ patella, and femur)	~~11~~10
B. Upper (fingers, hand, wrist, forearm, elbow, and humerus)	~~11~~10
C. Pectoral Girdle (shoulder, scapula, clavicle, and acromioclavicular joints)	~~3~~5
TOTAL	**25**
3. Skull and ~~/~~Sinuses	
A. Skull	~~8~~7
B. Paranasal Sinuses	~~8~~7
C. Facial Bones (orbits, nasal bones, mandible)	~~4~~6
TOTAL	**20**
4. Spine	
A. Cervical Spine	~~8~~6
B. Thoracic Spine	6
C. Lumbar Spine	~~8~~6
D. Sacrum, Coccyx, and Sacroiliac Joints	~~2~~5
E. Scoliosis Series	~~1~~2
TOTAL	**25**
5. Podiatric	
A. Foot and Toes	~~14~~10
B. Ankle	~~5~~6
C. Calcaneus (os calcis)	~~1~~4
TOTAL	**20**

FOCUS OF QUESTIONS [3]

1. **Positioning** (e.g., topographic landmarks, planes, anatomical alignment, body positions, path of central ray, positioning aids, respiration).

   ~~emphasis: high~~

2. **Anatomy** (including physiology, basic pathology, ~~and~~ related medical terminology).

   ~~emphasis: medium~~

3. **Evaluation of displayed anatomical structures** (e.g., patient positioning, tube-part-image receptor alignment).

   ~~emphasis: medium~~

4. **Procedure adaptation** (e.g., body habitus, ~~body mass index~~, trauma, pathology, age, limited mobility). ~~, casts, splints, soft tissue for foreign body, etc.)~~

   ~~emphasis: low~~

5. **Equipment and Accessories** (grids or Bucky, ~~compensating filter,~~ automatic exposure control [AEC], automatic collimation)

   ~~emphasis: low~~

Notes:

1. Candidates take one or more procedure modules based on the~~, depending on the type of~~ license they ~~have applied for~~intend to obtain. Each ~~procedure~~ module ~~has~~ includes 20 or 25 scored test questions, depending on the module (see chart above). ~~The number of questions within a module should be regarded as approximate values.~~
2. ~~Each of the procedure modules has five additional unscored questions.~~
3. ~~2~~. The procedure modules ~~may~~ include~~s~~ questions ~~about~~ from the five areas listed under *FOCUS OF QUESTIONS* on the right side of the chart. The podiatric module ~~does not include~~excludes questions from the equipment and accessories section.

Attachment A
Radiographic Positions and Projections

I. Chest

A. Chest
1. PA or AP upright
2. lateral upright
3. AP Lordotic
4. AP supine
5. lateral decubitus

II. Extremities

A. Toes
1. ~~AP, entire forefoot~~
2. AP or AP axial ~~toe~~
3. oblique ~~toe~~
4. lateral ~~toe~~
5. ~~sesamoids, tangential~~

B. Foot
1. AP axial
2. medial oblique
3. ~~lateral oblique~~
4. lateral
5. AP axial weight bearing
6. lateral weight bearing
7. oblique weight bearing

C. Calcaneus
1. lateral
2. plantodorsal, axial
3. dorsoplantar, axial

D. Ankle
1. AP
2. mortise
3. lateral
4. medial oblique
5. AP stress
6. AP weight bearing
7. lateral weight bearing
8. mortise weight bearing

E. Tibia and ~~/~~Fibula
1. AP
2. lateral

F. Knee~~/patella~~
1. AP
2. lateral
3. AP weight bearing
4. lateral oblique
5. medial oblique
6. PA axial–intercondylar fossa (Holmblad)
7. PA axial–intercondylar fossa (Camp Coventry)
8. AP axial–intercondylar fossa (Béclère)
9. ~~PA patella~~
10. t~~T~~angential (Merchant)
tangential (Settegast)

G. Patella
1. PA ~~patella~~
2. lateral
3. tangential axial sunrise (e.g., Merchant, Settegast)

11.

~~G~~H. Femur
1. AP
2. lateral

~~H~~I. Fingers
1. ~~PA entire hand~~
2. PA ~~finger only~~
3. lateral
4. medial and/or lateral oblique
5. AP thumb
6. medial oblique thumb
7. lateral thumb

7.

~~I~~J. Hand
1. PA
2. lateral
3. lateral oblique

~~J~~K. Wrist
1. PA
2. lateral oblique
3. lateral
4. PA–ulnar deviation
5. PA axial (Stecher)
6. tangential carpal canal (Gaynor-Hart)

~~K~~L. Forearm
1. AP
2. lateral

~~L~~M. Elbow
1. AP
2. lateral
3. lateral oblique
4. medial oblique
5. AP partial flexion
6. trauma axial laterals (Coyle)

~~M~~N. Humerus
1. AP
2. lateral
3. neutral
4. transthoracic lateral

~~N~~O. Shoulder
1. AP internal and external rotation
2. inferosuperior axial (Lawrence)
3. posterior oblique (Grashey)
4. AP neutral
5. PA oblique (scapular Y)

~~O~~P. Scapula
1. AP
2. lateral

~~P~~Q. Clavicle
1. AP or PA
2. AP or PA axial
3. ~~PA axial~~

~~Q~~R. Acromioclavicular Joints –
1. AP b~~B~~ilateral w~~W~~ith ~~and Without~~ w~~W~~eights
2. AP bilateral without weights

III. Skull, ~~/~~Sinuses, and facial bones

A. Skull
1. AP axial (Towne)
2. lateral
3. PA axial (Caldwell)
4. PA
5. submentovertex (full basal)

B. Facial Bones
1. lateral
2. parietoacanthial (Waters)
3. PA axial (Caldwell)
4. modified parietoacanthial (modified Waters)

C. Mandible
1. PA or PA axial
2. axiolateral or axiolateral oblique
3. AP axial (Towne)
4. submentovertex (SMV) or full basal

4.

~~C~~D. Nasal Bones
1. parietoacanthial (Waters)
2. lateral
3. PA axial (Caldwell)

~~D~~E. Orbits
1. parietoacanthial (Waters)
2. lateral
3. PA axial (Caldwell)
4. modified parietoacanthial (modified Waters)

~~E~~F. Paranasal Sinuses
1. lateral, horizontal beam
2. PA axial (Caldwell), horizontal beam
3. parietoacanthial (Waters), horizontal beam
4. ~~submentovertex (full basal), horizontal beam~~

IV. Spine

A. Cervical Spine
1. AP axial
2. AP open mouth
3. Lateral
4. Cross-table lateral (horizontal beam)
5. PA axial obliques
6. AP axial obliques
7. lateral swimmers
8. lateral flexion and extension
9. AP dens (Fuchs)

B. Thoracic Spine
1. AP
2. lateral, breathing
3. lateral, expiration
4. AP or PA thoracolumbar
5. Cross-table lateral (horizontal beam)

C. Scoliosis Series
1. AP or PA
2. lateral

D. Lumbar Spine
1. AP
2. PA
3. lateral
4. L5-S1 lateral spot
5. ~~posterior oblique~~
6. anterior oblique (RAO/LAO)
7. AP axial L5-S1
8. ~~AP right and left bending~~
9. ~~8~~9.lateral flexion and extension
10. 8. Cross-table lateral (horizontal beam

E. Sacrum and Coccyx
1. AP axial sacrum
2. AP axial coccyx
3. lateral sacrum and coccyx, combined
4. ~~lateral sacrum or coccyx, separate~~

F. Sacroiliac Joints
1. AP axial
2. posterior oblique

3. anterior oblique

V. Podiatric*

A. Foot and Toes
   1. dorsal plantar (DP)
   2. medial oblique
   3. lateral oblique
   4. lateral
   5. sesamoidal axial

B. Ankle
   1. AP
   2. mortise
   3. AP medial oblique
   4. AP lateral oblique
   5. Lateral

C. Calcaneus
   1. axial calcaneal
   2. Harris and Beath (ski-jump)

*weightbearing or non-weightbearing

~~Attachment B~~
~~Standard Terminology~~
~~for Positioning and Projection~~

~~***Radiographic View***: Describes the body part as seen by the image receptor. Restricted to the discussion of a *radiograph* or *image*.~~

~~***Radiographic Position***: Refers to a specific body position, such as supine, prone, recumbent, erect or Trendelenburg. Restricted to the discussion of the *patient's physical position*.~~

~~***Radiographic Projection***: Restricted to the discussion of the *path of the central ray*.~~

~~POSITIONING TERMINOLOGY~~

~~A. Lying Down~~

~~1. *supine* – lying on the back~~
~~2. *prone* – lying face downward~~
~~3. *decubitus* – lying down with a horizontal x-ray beam~~
~~4. *recumbent* – lying down in any position~~

~~B. Erect or Upright~~

~~1. *anterior position* – facing the image receptor~~
~~2. *posterior position* – facing the radiographic tube~~

~~C. Either Upright or Recumbent~~

~~1. oblique torso positions~~

~~a. anterior oblique (facing the image receptor)~~

~~i. *left anterior oblique (LAO)* – body rotated with the left anterior portion closest to the image receptor~~

~~ii. *right anterior oblique (RAO)* – body rotated with the right anterior portion closest to the image receptor~~

~~b. posterior oblique (facing the radiographic tube)~~

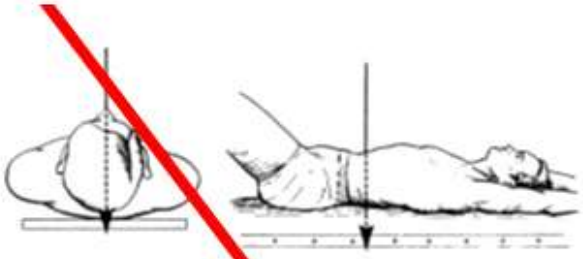
~~i. *left posterior oblique (LPO)* – body rotated with the left posterior portion closest to the image receptor~~

~~ii. *right posterior oblique (RPO)* – body rotated with the right posterior portion closest to the image receptor~~

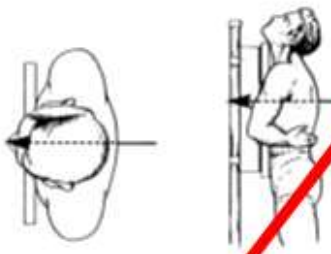
~~2. oblique extremity positions~~

~~a. lateral (external) rotation – outward rotation of the extremity~~
~~b. medial (internal) rotation – inward rotation of the extremity~~

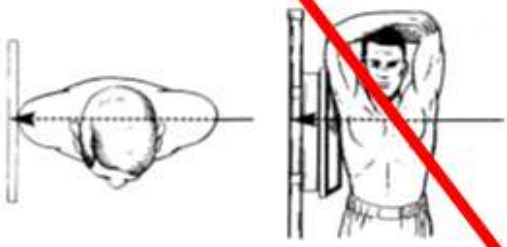
~~Anteroposterior Projection~~



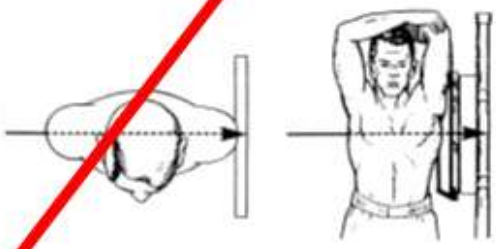
~~Posteroanterior Projection~~



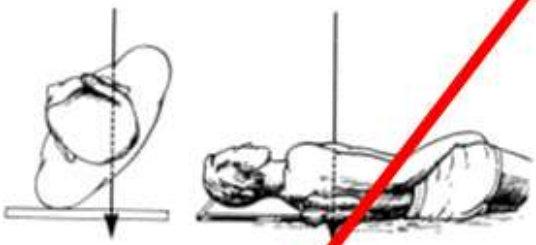
~~Right Lateral Position~~



~~Left Lateral Position~~

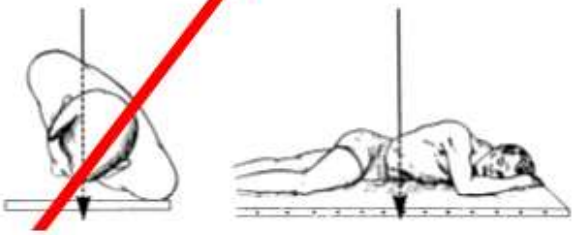


~~Left Posterior Oblique Position~~

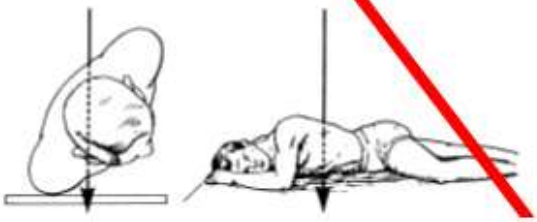


~~Right Posterior Oblique Position~~

~~Left Anterior Oblique Position~~



~~Right Anterior Oblique Position~~



Attachment BC

Task Inventory for Limited Scope of Practice in Radiography Examination

Activity		Content Categories PC = Patient Care S = Safety IP = Image Production P = Procedures
1.	Schedule patients, taking into consideration the length of the procedure, the patient's condition and age, and preparation for the procedure.	PC: 1.C
2.1.	Verify the patient's identity.	PC.1.A.2.A., PC.1.B., IP.1.D.
3.4.	Manage interpersonal interactions in an effective manner (e.g., variations in characteristics such as age, gender, and medical condition).	PC.1.B., PC.1.C.
2.4.	Evaluate the patient's ability to understand and comply with requirements for the requested examination.procedure. (e.g., physical, sensory, or cognitive impairments; need for medical interpreter)	PC.1.B.
3.5.	Obtain pertinent medical history.	PC.1.A.2.A., PC.1.B., PC.1.C.3.
28.6.	Screen female patients of childbearing age for the possibility of pregnancy and take appropriate action (e.g., document response, contact physician).	PC.1.A.2.F., PC.1.B., S.1.B.3.
5.7.	Review the examination procedure request to verify information is accurate, appropriate, and complete (e.g., patient history, clinical diagnosis, physician's orders).	PC.1.A.2.A., PC.1.A.2.F.
8.6.	Explain the procedure instructions to patient, patient's family, or authorized representative (e.g., pre-procedure, post-procedure).	PC.1.B.3.
9.7.	Respond as appropriate to procedure inquiries from the patient, patient's family, or authorized representative (e.g., scheduling delays, exam duration).	PC.1.B.
10.1.	Provide for the patient's safety, comfort, and modesty.	PC.1.B., PC.1.C., S.2.A.
11.8.	Monitor the patient's auxiliary medical equipment (e.g., IVs, supplemental oxygen) during a procedure.	PC.1.C.2.
1412.	Verify informed consent is obtained.as necessary.	PC.1.A.1.A., PC.1.B.
13.3.	Demonstrate and promote professional and ethical behavior (e.g., confidentiality, regulation compliance).	PC.1.A., PC.1.B.
14.9.	Follow environmental protection standards for handling and disposing of bio-hazardous materials (e.g., sharps, blood, body fluids, IV supplies).	PC.1.E.3., PC.1.F.
15.0.	Follow environmental protection standards for handling and disposing of hazardous materials (e.g., disinfectant, chemicals).	PC.1.E.3., PC.1.F.
16.2.	Notify appropriate personnel of adverse events or incidents (e.g., patient fall, wrong patient imaged).	PC.1.A.2., PC.1.C.3.

Activity		**Content Categories** PC = Patient Care S = Safety IP = Image Production P = Procedures
17.~~5.~~	Communicate relevant information to appropriate members of the care team.	PC.1.A., PC.1.B., PC.1.C.3.
18.~~16.~~	Practice Standard Precautions.	PC.1.E.3.
19.~~17.~~	Follow appropriate ~~procedures when caring for patients with communicable diseases~~.tranmission-based precautions	PC.1.E.3., PC.1.E.4., PC.1.E.5.
20.~~18.~~	Use positioning aids, as needed, to reduce patient movement, and/or promote patient comfort and/or safety.	PC.1.A.2.D., P.
21.~~19.~~	Use proper body mechanics when performing procedures to prevent work-related musculoskeletal disorders.~~and/or patient ergonomic devices to promote personnel safety.~~	PC.1.C.1.
22.	Use proper safe patient handling devices (e.g., transfer board, patient lift, and gait belt).	**PC**: 1.C
23.~~0.~~	Use sterile or aseptic technique when indicated.	PC.1.E.2.
24~~1~~.	Obtain vital signs when appropriate.~~.~~	PC.1.C.3.A.
25~~2~~.	Recognize and communicate the need for prompt medical attention.	PC.1.C.3., PC.1.D.
2~~3~~6.	~~Assist with providing~~Recognize the need for and administer emergency care (e.g., CPR, call for help).	PC.1.C.2., PC.1.C.3., PC.1.D.
24~~7~~.	Clean ~~and~~or disinfect~~, or sterilize~~ facilities and equipment (e.g., digital unit).	PC.1.E.2., PC.1.E.3
28.~~25.~~	Document required information ~~on the patient's medical record~~ (e.g., imaging procedure, ~~documentation~~, images, adverse events) on the patient's medical record.~~.~~	PC.1.A.2.F., PC.1.B.1.A., PC.1.C.3., IP.1.D., IP.2.B.6.
~~26.~~29.	Evaluate the need for ~~and use of~~ protective shielding and communicate this to the patient.~~.~~	S.2.B.3.
30.	Deploy appropriate protective shielding as needed.	S:2.B
~~27.~~31.	Take appropriate precautions (e.g., Image Wisely®, Image Gently®) ~~-~~to minimize radiation exposure to the patient.	S.2.A.
~~29.~~32.	Restrict the beam to the anatomical area of interest.	S.2.A.2., IP.1.A.1.G., IP.2.A.2.F.
3~~0~~.3.	Set technical factors to produce optimal images and minimize patient dose.	S.2.A., IP.1.A., IP.1.B.
~~31~~	~~Document radiographic procedure dose.~~	~~PC.1.A.2.F., S.2.A.5., IP.2.B.6.A.~~

Activity		**Content Categories** PC = Patient Care S = Safety IP = Image Production P = Procedures
32.4.	Keep all unnecessary persons out of the immediate area during radiation exposure.	S.2.B.2., S.2.B.4.B.
35.3.	Take appropriate precautions (ALARA) to minimize occupational radiation exposure.	S.2.B.
36.4.	Advocate for radiation safety and protection.	S.1.B., S.2.A., S.2.B.
37.3.5.	Describe the potential risk of radiation exposure when asked.	PC.1.B.3., S.1.B.
36.38.	Wear a radiation monitoring device according to guidelines while on duty.	S.2.B.4.
37.39.	Evaluate individual occupational exposure reports to determine if values for the reporting period are within established limits.	S.2.B.4.B.
38.40.	Select appropriate radiographic exposure factors using the following:	IP.1.A., IP.1.B.
	a. fFixed kVp technique chart	
	b. vVariable kVp technique chart	
	c. aAutomatic eExposure cControl (AEC)	
	d. aAnatomically programmed technique* * Applies to specific modules	
41.39.	Operate radiographic unit and accessories, including:	IP.2.A.1., IP.2.A.2., IP.2.A.3., IP.2.B.
	a. fFixed unit	
	b. mMobile unit	
42.0.	Operate digital imaging devices and information technology systems: including:	IP.2.A.2., IP.2.B.
	a. Computed radiography (CR)	
	ba. dDigital radiography (DR)	
	cb. Picture Archiving and Communication System (PACS, MIMPS)	
	dc. medical information systems (e.g., HIS, RIS, EMR, EHR)	
43.1.	Recognize and report malfunctions in the information technology systems (e.g., downtime procedures).	IP.2.B.6., IP.2.C.2.
442.	Remove radiopaque materials (e.g, dentures, clothing, jewelry) that could interfere with the image from the exposure field if they could interfere with the image.(e.g., clothing, jewelry).	PC.1.B.3., IP.1.E.7.
45.3.	Use radiopaque anatomical side markers at the time of image acquisition.	IP.1.D., IP.1.E.6.
46.4.	Select imaging accessories (e.g., physical grid*, virtual grid, lead blocker) compensating filter*) for the examination procedure requested.	S.2.A.2., IP.2.A.3., P.

Activity		Content Categories PC = Patient Care S = Safety IP = Image Production P = Procedures
474. ~~5.~~	Align central ray to body part and image receptor to demonstrate the desired anatomy.	S.2.A.6., IP.1.A., IP.1.E., IP.2.A.2.E., P.
~~46.~~48.	Explain breathing instructions prior to making the exposure.*	PC.1.B., IP.1.A.2.H., P.
~~47.~~49.	Position patient to demonstrate the desired anatomy using anatomical landmarks.	P.
~~48.~~50.	Modify exposure factors for circumstances such as involuntary motion, casts, ~~and~~ splints*, pathological conditions, or patient's inability to cooperate.	IP.1.A.2.H., IP.1.A.2.J., IP.1.A.3.J. IP.1.B., P.
~~49.~~51.	Adapt procedures for:	PC.1.C.3., PC.1.E., S.2.A.3., IP.1., P.
	a. p~~P~~atient condition (e.g., age, size, trauma, pathology)	
	b. l~~L~~ocation (e.g., mobile, ~~surgical,~~ isolation).	
50.2.	Select appropriate geometric factors (e.g., SID, OID, focal spot size, tube angle).	IP.1.A., IP.1.B.
51.3.	Evaluate images for diagnostic quality.	IP.1.D., IP.1.E., IP.2.C., P.
54. ~~2.~~	Respond appropriately to ~~digital~~ exposure indicator values.	IP.1.E.1.
55. ~~3.~~	Verify accuracy of patient identification associated with images.	IP.1.D., IP.1.E.6., P.
54.6.	Add electronic annotations on images to indicate position or other relevant information (e.g., ~~time,~~ upright, decubitus).	IP.1.D., IP.1.E.6., P.
~~55.~~57.	Perform post-processing on ~~digital~~ images in preparation for interpretation.	IP.2.B., P.
~~56.~~58.	Determine corrective measures if image is not of diagnostic quality and take appropriate action.	IP.1.E., IP.2.C., P.
~~57.~~59.	Identify image artifacts and make appropriate corrections as needed.	PC.1.B.3., IP.1.E.7.
~~58.~~60.	Store and handle image receptor in a manner ~~which~~ that will reduce the possibility of artifact production.	IP.1.E.7., IP1E.8., IP.2.A.2.E., IP.2.C.3
~~59.~~61.	Recognize and report malfunctions in the imaging unit and accessories.	IP.1.E.7., IP.2.C.
~~60~~62.	Recognize the need for periodic maintenance and evaluation of radiographic equipment affecting image quality and radiation safety (e.g., shielding, image display monitor, light field, central ray detector calibration).	IP.2.C.
~~61.~~	~~Perform routine maintenance on digital equipment including:~~	IP.2.C.

Activity		Content Categories PC = Patient Care S = Safety IP = Image Production P = Procedures
	a. ~~Detector calibration~~	
	~~b. CR plate erasure~~	
	~~c. Equipment cleanliness~~	
	~~d. Test images~~	
Perform the following diagnostic examinations:		
~~62.~~63.	Chest	P.1.A
6~~43.~~.	Cervical spine	P.4.A.
65.	Cross-table lateral horizontal beam recumbent spine	P.4
~~6~~66.~~4.~~	Thoracic spine	P.4.B.
67.	Thoracolumbar spine	P.4
68.~~4.~~	Scoliosis series	P.4.E.
69.~~66.~~	Lumbar spine	P.4.C.
70.~~67.~~	Sacrum and~~/~~coccyx	P.4.D.
71.~~68.~~	Sacroiliac joints	P.4.D.
72~~69.~~	Skull	P.3.A.
73~~0.~~	Facial bones	P.3.C.
74.	Mandible	P.3.C.
75.~~1.~~	Nasal bones	P.3.C.
76.~~2.~~	Orbits	P.3.C.
~~7~~77.~~3.~~	Paranasal sinuses	P.3.B.
~~7~~78.~~4.~~	Toes	P.2.A., P.5.A.
79.~~5.~~	Foot	P.2.A., P.5.A.
80.~~76.~~	Calcaneus	P.2.A., P.5.C.
81.~~77.~~	Ankle	P.2.A., P.5.B.
82.~~78.~~	Tibia and ~~/~~fibula	P.2.A.
83.~~79.~~	Knee and ~~/~~patella	P.2.A.
84.~~0.~~	Femur	P.2.A.
85.~~1.~~	Fingers	P.2.B.
86.~~2.~~	Hand	P.2.B.
87.~~8.~~3.~~3.~~	Wrist	P.2.B.
~~8~~88.~~4.~~	Forearm	P.2.B.
~~8~~89~~5.~~	Elbow	P.2.B.

Activity		**Content Categories** PC = Patient Care S = Safety IP = Image Production P = Procedures
90.~~86.~~	Humerus	P.2.B
91.~~87.~~	Shoulder	P.2.C.
92.~~88.~~	Scapula	P.2.C.
93.~~89.~~	Clavicle	P.2.C.
94.~~0.~~	Acromioclavicular joints	P.2.C