

Radiologist Assistant Curriculum

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Introduction

The goal of this curriculum is to provide a baseline of knowledge for the development of radiologist assistant education programs. A radiologist assistant is an advanced-practice radiologic technologist who works under the supervision of a radiologist to enhance patient care by assisting the radiologist in the imaging environment. The radiologist assistant is an American Registry of Radiologic Technologist (ARRT)-certified radiographer who has successfully completed an academic program including a nationally recognized radiologist assistant curriculum and a radiologist-directed clinical preceptorship. Under radiologist supervision, the radiologist assistant performs patient assessment, patient management and imaging procedures. The title “radiologist assistant” reflects the nature of the relationship between the radiologist and the radiologist assistant working in an advanced clinical role. The radiologist assistant’s professional role and clinical responsibilities, as part of the radiologist-led team, are to serve as a radiologist physician extender. This curriculum is for educational programs preparing learners for the ARRT’s registered radiologist assistant certification exam.

The radiologist assistant has three primary areas of responsibility, all performed under the supervision of a radiologist:

1. Participate in patient assessment, patient management and patient education.
2. Perform invasive or noninvasive imaging procedures.
3. Participate in the systematic analysis of the quality of patient care delivered within the medical imaging environment.

The radiologist assistant’s role is unique because of the extensive medical imaging expertise and radiation safety knowledge required. The radiologist assistant is expected to perform each function competently and to understand how each activity fits into the entire continuum of a patient’s care.

The content and objectives of this curriculum are organized to meet the mission, goals and needs of radiologist assistant programs. Items within each section may be modified to meet regional, state or institutional needs. The descriptions and objectives are general in nature and not exhaustive. Instructors are expected to modify the descriptions and objectives to reflect personal knowledge, experience, institutional preference and accreditation requirements. Curriculum content in outline form is intended to cover general knowledge that should be included in the curriculum, while allowing instructor latitude in choosing specific content. This curriculum is suitable for programs offered at a master’s level.

The curricula that arise from this document will provide a foundation of knowledge and experience that supports continued career growth of technologists, a format for advanced-level education and a cultural standard within the medical imaging community that encourages meaningful professional collaboration.

Radiologist Assistant Curriculum

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Core Content

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Patient Assessment, Management and Education

Description

This content reinforces the use of the clinical thinking model to aid in patient assessment, which includes interviewing skills and assessment techniques. The focus is on applying the radiologist assistant's knowledge of anatomy, physiology and pathophysiology to assist in patient assessment and management.

Prerequisite or Corequisite

Radiologist assistants must possess certification in advanced cardiac life support (ACLS) to support their role in the patient care setting.

Objectives

- Apply systematic clinical analysis to history and physical assessment findings in the medical imaging setting.
- Conduct interviews to confirm and document a patient's medical history.
- Perform and document a physical assessment of the patient undergoing imaging procedures.
- Obtain and analyze the patient's vital signs.
- Document initial observations during an examination to communicate with the supervising radiologist and contribute to the planning and management of the patient.
- Provide patient education.
- Adapt communication techniques to address patient needs.
- Review patient medical data for indications, contraindications and alterations to procedures.
- Document, communicate and implement licensed practitioner orders to the appropriate members of the health care team.
- Identify and respond to changes in patient status, procedural complications and emergencies.
- Analyze laboratory data and correlate to patient status, pathological processes and procedural considerations.

Content

I. History and Physical Assessment

- A. Identify abnormal and normal findings
- B. Anatomically localize findings
- C. Communicate findings to the supervising radiologist
- D. Correlate findings with known patient conditions
- E. Identify potentially life-threatening and procedure-altering conditions

II. Interviewing and Patient History

- A. Medical history purpose and components
 1. Preliminary data
 - a. Date and time of history
 - b. Identifying data
 - c. Reliability
 2. Chief complaint
 3. Current condition
 4. Past (medical and social) history
 5. Prior surgical history
 6. Medications
 7. Allergies
 8. Family history
 9. Laboratory values
 10. Indications or contraindications to the procedure
 11. Change in patient management related to the procedure
 12. Medical analysis and interpretation of data
 13. Psychological and cognitive status
 - a. Cognitive abilities
 - b. Emotional stability
- B. Interviewing skills
- C. Challenges
 1. Patient age, physical attributes, cognitive ability and cultural background
 2. Adaptations and alterations based on patient status
- D. Optimal wellness and quality care for all patients
 1. Barriers
 2. Health outcomes, including morbidity and mortality
 3. Social factors
 4. Patient and family centered care
 5. Adapting to patient needs

- a. Processes
- b. Interpersonal engagement
- 6. Health literacy

III. Vital Sign Assessment

- A. Obtaining patient vital signs
 - 1. Temperature
 - 2. Respiration
 - 3. Pulse
 - 4. Blood pressure
 - 5. Pain scale
 - 6. Oxygen saturation

IV. Assessment of the Abdomen

- A. Physical assessment findings
 - 1. Inspection
 - 2. Percussion
 - 3. Auscultation
 - 4. Palpation
- B. Correlation of abdominal assessment findings to imaging-related disease processes

V. Assessment of the Thorax and Lungs

- A. Physical assessment findings
 - 1. Inspection
 - 2. Auscultation
 - 3. Percussion
 - 4. Palpation
- B. Correlation of chest assessment findings to imaging-related disease processes

VI. Assessment of the Cardiovascular System

- A. Physical assessment findings
 - 1. Inspection
 - 2. Auscultation
 - 3. Palpation
- B. Correlation of cardiovascular findings to imaging-related disease processes

VII. Assessment of the Musculoskeletal System

- A. Physical assessment findings
 - 1. Inspection
 - 2. Palpation
 - 3. Sensory-motor function and range of motion

- B. Correlation of musculoskeletal findings to imaging-related disease processes

VIII. Assessment of the Peripheral Vascular System

- A. Physical assessment findings
 - 1. Inspection
 - 2. Palpation
 - 3. Auscultation
 - 4. Evaluation for edema
- B. Correlation of peripheral vascular findings to imaging-related disease processes

IX. Assessment of the Nervous System

- A. Mental status
- B. Sensory and motor evaluation
- C. Mood and behavior evaluation
- D. Neurological assessment and data interpretation
- E. Correlation of nervous system findings to imaging-related disease processes

X. Assessment of the Endocrine System

- A. Physical assessment findings
 - 1. Inspection
 - 2. Palpation
- B. Correlation of endocrine findings to imaging-related disease processes

XI. Assessment of the Breasts and Axillae

- A. Physical assessment findings
 - 1. Inspection
 - 2. Palpation
- B. Correlation of breast and axillae findings to imaging-related disease processes

XII. Documentation of Findings

- A. Characteristics required to describe a symptom
 - 1. Onset
 - 2. Location
 - 3. Duration
 - 4. Character
 - 5. Aggravating/associated factors
 - 6. Relieving factors
 - 7. Temporal factors

8. Severity of symptoms

B. Reporting

1. Accreditation and facility protocol
2. Patient health record reporting protocol

XIII. Patient Management

A. Infection control

1. Sterile technique
2. Standard precautions

B. Postprocedure resources

C. Patient monitoring during procedures

1. Intravenous lines
2. Oxygen saturation
3. Urine output
4. Cardiac rhythms
5. Blood pressure/hemodynamics

D. Medical complications and emergency intervention

E. Medical devices

1. Imaging appearance
2. Indications
3. Purpose
4. Location
5. Complications
6. Incident reports

F. Patient care (e.g., AHA Patient Care Partnership)

1. BLS
2. ACLS

XIV. Common Laboratory Tests and Significance

XV. Patient Education and Instruction

A. Preprocedure

B. Postprocedure and follow-up

XIV. Documentation and Implementation of Licensed Practitioner Orders

A. Verbal orders

- B. Telephone orders
- C. Electronic orders
- D. Written orders
- E. Standing protocols

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Pharmacology and Clinical Decision-Making in Imaging

Description

This content covers the pharmaceuticals commonly prescribed to patients undergoing medical imaging. The intent of each drug and its effect on diseases, conditions and physiology should be addressed. This content in combination with associated clinical skills will allow the radiologist assistant, as part of a radiologist-led team, to analyze the patient's medications and other therapies to determine their significance to the imaging procedure. The radiologist assistant will be able to suggest appropriate plans for the procedure for each patient and will be responsible for the administration and documentation of procedure-related pharmaceuticals, including sedation. The ability to assess contraindications and monitor the patient for adverse events, as well as respond to them, is critical. It is also essential for radiologist assistants to clearly understand the laws and policies related to pharmaceuticals in their practice setting.

Objectives

- Identify key drug laws affecting consumer safety.
- Identify the five schedules of controlled substances.
- Identify the roles of the monitoring federal regulatory and enforcement agencies for consumer drugs.
- Identify strategies for health care workers involved in dispensing medications to comply with the restrictions of drug laws.
- Identify acceptable and unacceptable abbreviations and symbols used for medication orders.
- Differentiate drug names (e.g., generic, chemical, trade, official).
- Explain the restrictions on drug sales associated with the designations *over the counter*, *legend drug* and *controlled substance*.
- Research drug reference information from current pharmacological resources.
- Describe how the body metabolizes various drugs.
- List common variables affecting drug action within the body.
- Recognize unexpected responses to drugs.
- Explain the purposes for and principles of clinical drug trials.
- Perform calculations for drug dose delivery.
- Describe various forms of drug preparations and supplies.
Incorporate the principles of responsible drug administration in the patient care setting to prevent medication errors.
- Apply medical techniques of drug administration for common delivery routes.
- Modify drug doses for pediatric and geriatric patients.
- Identify factors that can lead to cumulative effects in elderly patients.
- List the categories of drugs that frequently cause adverse effects in older adults.
- Identify guidelines and competencies for sedation and analgesia according to accreditation standards.
- Explain the adverse effects and cautions associated with preprocedural medications.

- Describe the administration, indications, contraindications and adverse effects related to minimal and moderate (conscious) sedation and local anesthetics.
- Assess, evaluate, and manage the patient prior to and during examinations requiring moderate sedation.
- Recognize, explain and respond to the indications, contraindications and adverse effects of medications.
- Describe the indications and precautions associated with oxygen therapy.
- Describe guidelines for preparation and dispensation of medications, including compounding, for imaging procedures per approved protocols.

ASRT

Content

I. Consumer Safety and Drug Regulations

- A. Laws and regulations

- B. Roles of government regulatory agencies
 - 1. Food and Drug Administration (FDA)
 - 2. Drug Enforcement Agency (DEA)

II. Medication Orders

- A. Common abbreviations
 - 1. Acceptable abbreviations
 - 2. Unacceptable abbreviations

- B. Policies and regulations
 - 1. Verbal, written and standing orders
 - 2. Order verification

- C. Medication components
 - 1. Patient identifiers
 - 2. Medication
 - a. Dose
 - b. Quantity
 - c. Route
 - d. Time

- D. Medication reconciliation

III. Pharmaceutical Terminology References

- A. Classifications

- B. Schedules for controlled substances

- C. Identifying names (e.g., generic, trade)

- D. Legal terms referring to drugs (e.g., over the counter)

IV. Sources of Drug Information (e.g., PDR, USP)

V. Pharmacotherapeutic Decision-making

- A. Drug effects and indications

- B. Pharmacokinetics
 - 1. Absorption
 - 2. Distribution
 - 3. Metabolism

4. Excretion
5. Other variables (e.g., age, weight, sex, psychological state)
6. Drug interactions
 - a. Synergism
 - b. Potentiation
 - c. Antagonism
7. Dosage
 - a. Minimum and maximum dose
 - b. Loading dose
 - c. Maintenance dose
 - d. Toxic dose
 - e. Lethal dose
 - f. Therapeutic dose
8. Route

- C. Patient considerations (e.g., pediatric, geriatric, pregnancy)
 1. Anatomic and physiologic variables
 2. Pharmacokinetic and pharmacodynamic considerations
 3. Dosing considerations
- D. Contraindications, warnings, adverse effects and events, adverse reactions and interactions

VI. Clinical Drug Trials

- A. Principles of the controlled trial
- B. Protection of subjects
- C. Research design (e.g., single-blind, double-blind)

VII. Safe Dosage Preparation (e.g., Calculation Guidelines)

- A. Anatomic and physiologic variables (e.g., renal and hepatic function)
- B. Safe dose calculation
 1. Ratio
 2. Proportion
 3. Dimensional analysis
- C. Factors affecting dose
 1. Body surface area
 2. Weight
 3. Age
- D. Medication preparation and compounding guidelines
 1. Regulatory agencies

2. [FDA compounding definition](#)
3. Types of compounding
 - a. Sterile (e.g., steroids, contrast media)
 - b. Nonsterile (e.g., gastrointestinal contrast media)

VIII. Principles of Drug Administration

- A. Accurate drug administration
- B. Medication error avoidance
- C. Administration routes
- D. Documentation
 1. Administration
 - a. Dose
 - b. Time
 - c. Route
 - d. Location of injections
 2. Narcotics and medications
 3. Adverse events reporting
 4. Patient outcome

IX. Procedural Medication

- A. Sedation and analgesia policies and procedures
- B. American Society of Anesthesiologist (ASA) guidelines
- C. Equipment
 1. Monitoring equipment
 2. Intubation equipment
- D. Medications
 1. Local anesthetics
 2. Analgesics
 3. Benzodiazepines
 4. Reversal medications
- E. Minimal and moderate (conscious) sedation
 1. Appropriateness of sedation
 2. Contraindications
 - a. Absolute
 - b. Relative
 3. Altered level of consciousness and mood
 4. Maintenance of consciousness
 5. Cooperation

6. Elevation of pain threshold
 7. Minimal variation of vital signs
 8. Rapid degree of amnesia
 9. Recovery and ambulation
 10. Adverse effects
 - a. Treatment
 - 1) BLS
 - 2) ACLS
- F. Patient assessment and medication documentation
1. Informed consent
 2. Procedural assessment (e.g., vital signs, laboratory values, level of consciousness)
- G. Airway management
- H. Patient recovery period (e.g., airway, vital signs, level of function)

X. Nonprescription and Dietary Supplements

- A. Impact on procedures
- B. Interactions

XI. Drugs by Body System

- A. Autonomic nervous system drugs
 1. Adrenergics (sympathomimetics)
 2. Adrenergic blockers (alpha and beta blockers)
 3. Cholinergics (parasympathomimetics)
 4. Cholinergic blockers (anticholinergics)
- B. Central nervous system drugs
 1. Anesthetics, sedatives and hypnotics
 2. Anticonvulsants
 3. Parkinson disease medications
 4. Alzheimer disease medications
 5. Neurologic and psychotropic medications
 6. Alcohol and drugs of abuse
- C. Urinary medications
 1. Diuretics
 2. Gout medications
 3. Antispasmodics
 4. Prostatic medications
 5. Overactive bladder medications
- D. Gastrointestinal drugs

1. Reflux medications
 2. Ulcerative disease medications
 3. Inflammatory bowel disease medications
 4. Antispasmodics
 5. Gastrointestinal motility and function medications
 6. Antiemetics
 7. Antidiarrheals
- E. Endocrine system drugs
1. Pituitary hormones
 2. Adrenal corticosteroids
 3. Thyroid medications
 4. Diabetes medications
- F. Reproductive system drugs
1. Hormones
 2. Erectile dysfunction medications
- G. Cardiovascular drugs
1. Cardiac glycosides
 2. Antiarrhythmic medications
 3. Antihypertensives
 4. Antilipemic medications
 5. Vasoconstrictors/vasodilators
 6. Anticoagulants
 7. Vascular drugs (e.g., coagulation modifiers, thrombolytics, platelet inhibitor therapy)
- H. Respiratory system drugs
1. Oxygen
 2. Bronchodilators
 3. Corticosteroids
 4. Mucolytics and expectorants
 5. Antihistamines
 6. Decongestants
- I. Musculoskeletal drugs
1. Skeletal muscle relaxants
 2. Osteoporosis therapy
 3. Injectable steroids

XII. Drugs Affecting Multiple Organ Systems

- A. Anti-infective drugs
- B. Antineoplastic and Antimetabolite

1. Precautions and proper handling
- C. Analgesic
 - D. Antipyretic
 - E. Anti-inflammatory drugs
 - F. Fluid and electrolyte replacements

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Contrast Media

Description

This content covers the contrast media used during procedures. Topics include an overview of the chemical makeup and physical properties of contrast agents. The criteria for selecting contrast agents for procedures are also included, based on patient risk factors, premedication strategies and indicators of contrast media reaction. The radiologist assistant's role in the care and treatment of patients experiencing adverse reactions to contrast media is also described.

Objectives

- Determine the appropriate use of contrast media based on patient factors and procedural requirements.
- Describe the physical properties, structural differences and pharmacologic characteristics of contrast media.
- Identify patients at increased risk of an adverse reaction to contrast media.
- Identify the response strategies for patients with a predisposition to allergic reactions to contrast media.
- Classify the indicators and symptoms associated with mild, moderate or severe reactions to contrast media and respond appropriately.
- Implement protocols to treat a patient experiencing an adverse reaction to contrast media.
- Discuss patient counseling and follow-up care for patients undergoing a procedure that uses contrast media.
- Identify and treat contrast media extravasation.

Content

I. Contrast Media Selection

- A. Barium, iodinated contrast, magnetic resonance and echogenic agents
 - 1. Procedural requirements
 - 2. Reaction and complication causes
 - 3. Risk factors (e.g., renal function)
 - 4. Special considerations (e.g., glucagon, metformin administration)

II. Contrast Media and Preparations

- A. Negative agents
- B. Positive agents
- C. Magnetic resonance contrast agents
- D. Echogenic agents

III. Characteristics of Iodinated Contrast Materials

- A. Water solubility and hydrophilicity
- B. Osmolarity
- C. Osmolality
- D. Viscosity
- E. Calcium binding
- F. Chemical stability

IV. Current Contrast Media

V. Contrast Media Risk Reduction

- A. Patient assessment
- B. Premedication and hydration protocols
- C. Dosage
- D. Alternative procedure consultation
- E. Complications related to contrast
 - 1. Nephrotoxicity
 - 2. Nephrogenic systemic fibrosis
 - 3. Extravasation

VI. Contrast Media Reaction

- A. ACR Manual on Contrast Media
 - 1. Guidelines
 - a. Contraindications
 - 1) Absolute
 - 2) Relative
 - 2. Recognition and types of reactions
 - a. Mild to severe
 - b. Allergy-like
 - c. Physiologic
 - 3. Treatment
 - a. Premedication protocols
 - b. Allergic reaction treatment
 - c. Resuscitation
 - 1) BLS
 - 2) ACLS
 - 3) Basic drugs
 - B. Standing protocols
 - C. Verbal orders

VII. Patient Care Following Contrast Media Administration

- A. Patient counseling
- B. Postprocedure instructions
- C. Follow-up communication
- D. Protocols for extravasation
- E. Postprocedure complications

VIII. Documentation

- A. Administration
 - 1. Dose
 - 2. Time
 - 3. Route
 - 4. Location of injections
- B. Adverse event reporting
- C. Patient outcome

Pathophysiology

Description

This content covers the characteristics and manifestations of disease caused by alterations or injury to the structure or function of the body. Radiologist assistants will be exposed to basic pathophysiology concepts as well as common disease conditions to understand alterations that occur in major body systems. Image correlation with these pathologies should be emphasized.

Objectives

- Define terminology used in the study of disease.
- Describe the general principles and mechanisms of disease.
- Explain the physiological response of inflammation and cell injury due to pathological insult.
- Differentiate various types of cellular and tissue injury and adaptive mechanisms.
- Describe the disorders of fluid and electrolyte balance.
- Differentiate between the mechanisms of tissue repair and healing.
- Identify common tests used to diagnose disease or injury.
- Examine the role of nutrition and genetics in various disorders.
- Describe the common etiology, signs and symptoms, diagnostic tests, typical course and management of common diseases and disorders.
- Discuss the common effects of aging on each body system.

Content

I. Alterations in Cell Function and Growth

- A. Cell and tissue characteristics
- B. Cellular adaptation and injury
- C. Genetic and congenital disorders
- D. Alterations in cell differentiation
- E. Tissue repair and wound healing

II. Alterations in Body Defenses

- A. Stress and adaptation
- B. Alterations in temperature regulation
- C. Infectious processes
- D. Inflammation and repair
- E. The immune response
- F. Alterations in the immune response
- G. Acquired immunodeficiency syndrome (AIDS)
- H. White blood cell and lymphoproliferative disorders
- I. Alterations in hemostasis and blood coagulation

III. Alterations in Body System Functions:

- A. Body Systems
 - 1. Skin
 - 2. Respiratory
 - 3. Cardiac
 - 4. Gastrointestinal
 - 5. Urinary
 - 6. Vascular
 - 7. Musculoskeletal
 - 8. Neurologic
 - 9. Hematologic
 - 10. Endocrine
 - 11. Reproductive
 - 12. Breast and Axilla

B. Pathophysiology assessment related to the following categories:

1. Vascular
2. Infection
3. Neoplasm
4. Drug effects/ degenerative changes
5. Inflammatory/ idiopathic
6. Congenital
7. Autoimmune
8. Traumatic
9. Endocrine/ metabolic

IV. Alterations in Structure and Function Related to Aging

A. Physiologic changes of aging

B. Functional considerations of aging

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Radiologic Procedures

Description

This content covers materials, equipment, and procedural information required for radiologist assistant participation in diagnostic and therapeutic procedures. Procedural information includes risk factors related to the procedures, protocols for imaging procedures, pre- and post-procedure care and instructions, and tools for measuring outcomes against procedural goals. Examination procedures should follow American College of Radiology (ACR) practice guidelines for producing high-quality radiologic images and patient care.

Note: For a specific list of entry level examinations and procedures, reference the current [ARRT® Registered Radiologist Assistant Entry-Level Clinical Activities \(ELCA\)](#).

Objectives

- Identify the information, materials and equipment required for imaging procedures.
- Describe the protocols for imaging procedures.
- Identify factors requiring an alteration or modification to examinations.
- Explain risk factors related to examinations.
- Assess procedure requests using ACR Appropriateness Criteria.
- Perform procedures and document initial observations as part of the radiologist-led team.
- Measure examination outcomes against examination goals.
- Describe postprocedural patient care and instructions.

Content

I. Procedural Guidelines and Examination Protocols

- A. Examination-specific anatomy and pathophysiology
- B. Indications and contraindications for procedure
- C. Patient assessment and preparation for the procedure
- D. Alternative and complementary procedures
- E. Appropriate imaging disciplines
- F. Safe operation of imaging equipment
- G. Radiation safety
- H. Devices and supplies
 - I. Administration of contrast media, radiopharmaceuticals and drugs
 - J. Evaluation of image quality for diagnostic utility
 - K. Image enhancement and postprocessing
 - L. Complications and adverse event response
- M. Pre-, peri-, and postprocedure patient care and education
- N. Outcomes measurement
- O. Health record
 - 1. History and physical
 - 2. Progress notes
 - 3. Initial observations
 - 4. Consent
- P. Documentation of initial observations for supervising radiologist

II. Examinations and Procedures

- A. Abdominal
- B. Thoracic
 - 1. Breast and axilla
 - 2. Cardiovascular
 - 3. Pulmonary

- C. Urinary and reproductive
- D. Musculoskeletal
- E. Endocrine
- F. Neurological
- G. Vascular
- H. Lymphatic

ASRT

Discipline and Image Management

Description

This content establishes a knowledge base in the fundamentals of fluoroscopy, computed tomography, magnetic resonance, medical sonography, nuclear medicine and image postprocessing techniques. Education should promote awareness of the advantages and limitations of each area. Procedures and techniques to optimize image quality while minimizing radiation exposure are included.

Objectives

- Make prudent judgment for the use of equipment as a diagnostic tool.
- Identify the advantages and limitations of equipment and various exposure settings.
- Identify the functional components involved in the operation of equipment and devices.
- Apply equipment and safety features to minimize radiation exposure to patients and operators.
- Employ methods and techniques to maximize diagnostic value while minimizing radiation exposure.
- Educate others on radiation protection practices during examinations.
- Provide patient education regarding the operation and benefits of various imaging disciplines.
- Ensure that equipment operates safely and in a standardized manner.

Content

I. Fluoroscopy: Pediatric and Adult

- A. Patient preparation
- B. Patient assessment
- C. Clinical advantages
 - 1. Demonstration of dynamic anatomy
 - 2. Localization
 - 3. Documentation
- D. Components of fluoroscopic units
 - 1. Table
 - 2. Radiation source
 - 3. Image receptor carriage
 - 4. Optics system
 - 5. Locks and angle indicators (fixed or mobile)
 - a. Structural provisions for radiation shielding
 - 6. Equipment provisions
 - a. Source-to-skin distance (SSD)
 - b. Object-to-image receptor distance (OID)
 - c. Source-to-image receptor distance (SID)
 - d. Control of radiation field
 - e. Maximum exposure rate
 - f. Lead apron requirements
 - g. Maximum entrance dose versus equipment setup and technique
 - h. Scatter/isodose curves for fixed and mobile equipment and personnel placement
 - i. High-level or boost-mode fluoroscopy
 - j. Pulsed fluoroscopy
 - k. Last image hold
 - l. Emergency stop
 - m. Automatic exposure rate control (AERC)
 - 7. Fluoroscopic dose recording
 - 8. Image recording, archival and retrieval
- E. Technical factors affecting radiation dose
 - 1. Direct factors
 - a. Milliamperage (mA)
 - b. Peak kilovoltage (kVp)
 - c. Collimation
 - 1) Impact on integral dose
 - d. Filtration
 - 1) Inherent
 - 2) Added

- e. Exposure time
- f. Geometry (SID, SSD and Angulation)
- g. Grids
- h. Pulse fluoroscopy
- i. High-dose fluoroscopy mode
- j. Pediatric versus adult default settings
2. Indirect factors
3. Dose reduction (patient and operator)
 - a. Shielding
 - b. Lead drape
 - c. Bucky slot cover
 - d. Lead apron
 - e. Leaded glasses
 - f. Leaded gloves
 - g. Three-phase and high-frequency generators
 - h. Protective barriers
 - i. Cumulative timer
 - j. High dose mode alarm
 - k. Mobile equipment setup
 - l. Distance from source
4. Image receptor
 - a. Image quality considerations
 - b. Quantum mottle
 - c. Contrast resolution
 - d. Image resolution
 - e. Image distortion
 - f. Intensifier
 - 1) Lag
 - 2) Vignetting
 - 3) Pincushion
 - 4) Magnification
 - g. Flat panel technology
5. Ancillary equipment
 - a. Optics system
 - b. Image display systems
 - c. Cinefluorography
 - 1) Synchronous
 - 2) Framing frequency
 - d. Contrast media
 - e. Accessories
 - f. Grids
6. Image processing
7. Digital systems
8. Patient characteristics affecting beam attenuation
9. Operator controls of the fluoroscopic unit

- a. Control panel settings for fluoroscopy versus dose
 - b. Fluoro tower movement and carriage locks
 - c. Tabletop movement
 - d. Collimator control
 - e. Compression devices
 - f. Fluoro grid device
 - g. Exposure switches
10. Patient supports and immobilization devices

F. Patient dose and image quality

II. Computed Tomography: Pediatric and Adult

A. Patient preparation

B. Patient assessment

C. Radiation safety and dosimetry

- 1. Technical factors affecting patient dose
- 2. Radiation protection
- 3. Dose measurement
- 4. Patient dose reduction

D. Image processing

- 1. Reconstruction
- 2. Postprocessing
- 3. FOV modification
- 4. Algorithms
- 5. Cardiac analysis

E. Image Quality

III. Magnetic Resonance (MR): Pediatric and Adult

A. Patient preparation

B. Patient assessment

C. MR screening and safety

- 1. Patient screening
 - a. Biomedical implants
 - 1) FDA Labeling
- 2. Safety (e.g., zones, nonferromagnetic ancillary equipment, ferromagnetic foreign bodies, quenching)
- 3. Environment (e.g., magnetic and radiofrequency shielding)
- 4. Biological considerations
 - a. RF field

- b. Static and gradient magnetic fields
 - c. Acoustic noise
 - D. Pulse sequence configurations
 - C. Postprocessing
 - 1. Maximum intensity projection (MIP)
 - 2. Multiplanar reconstruction techniques (MPR)
 - 3. Cardiac analysis
 - 4. 3D reconstruction
 - 5. Quantitative measurement
 - a. Volume
 - b. Distance
 - c. Diameter
 - D. Functional imaging
 - E. Sequence parameters and options
 - F. Tissue characteristics
- IV. Medical Sonography: Pediatric and Adult**
 - A. Patient preparation
 - B. Patient assessment
 - C. Physics principles
 - 1. Properties of ultrasound waves
 - 2. Interactions of sound with tissue
 - 3. Power, intensity and amplitude
 - 4. Units of measurement
 - B. Ultrasound transducers
 - 1. Construction and physical characteristics
 - 2. Function (e.g., sector, linear, phased arrays)
 - 3. Spatial resolution
 - 4. Transducer selection
 - 5. Scanning planes
 - C. Pulse-echo instrumentation
 - D. Doppler instrumentation and hemodynamics
- V. Nuclear Medicine: Pediatric and Adult**

- A. Patient preparation
- B. Patient assessment
- C. Nuclear medicine radiopharmaceutical principles
- D. Radiopharmaceutical safety
- E. Theory of operation
- F. Image formation and reconstruction
- G. Diagnostic procedures

VI. Image Postprocessing

- A. Processing techniques
 - 1. 2D display tools
 - 2. 3D display tools
 - 3. Segmentation tools (i.e., cutting, region growing, dilation/erosion)
- B. Data volume
- C. Multiplanar reformations
- D. Maximum intensity projection (MIP)
 - 1. Principle
 - 2. Applications
 - 3. Artifacts
- E. 3D surface rendering (SSD)
 - 1. Principle
 - 2. Applications (e.g., image rotation and viewing angle, presurgical planning)
 - 3. Artifacts
- F. Volume rendering techniques
 - 1. Principle
 - 2. Applications
 - 3. Artifacts
- G. Virtual endoscopy
 - 1. Principle
 - 2. Applications
 - 3. Artifacts

VII. Equipment Safety

- A. Regulations
- B. Hazard identification and control
- C. Policies and procedures
 - 1. Occupational Safety and Health Administration (OSHA)
 - 2. Federal Drug Administration (FDA)
 - 3. Facility
 - 4. State
- D. Employee training
- E. Fire, electrical and chemical safety
- F. Magnetic and RF field safety
- G. Injury prevention
- H. Quality improvement
- I. Risk management
- J. Infection control

Radiation Safety, Radiobiology and Health Physics

Description

This content expands on prior knowledge to enhance protection of patients and personnel from the harmful effects of ionizing radiation. This includes an overview of the regulatory bodies and patient radiation safety regulations affecting modern diagnostic imaging. The effect of ionizing radiation on biological samples is included. Interactions of ionizing radiation with matter, units of exposure and dose, radiation detection and measurement devices will be outlined. Practical techniques for reducing patient and operator risk of exposure to ionizing radiation are also introduced.

Objectives

- Identify organizations that set standards for radiation safety and radiopharmaceuticals.
- Describe the mechanism by which ionizing radiation interacts with matter.
- Explain the quantitative relationships between radiation exposure and biological damage.
- Identify instruments used for measuring accumulated dose, measured dose and dose rate.
- Describe the operating principles of common radiation measuring devices.
- Distinguish between radiation exposure and radiation absorbed dose.
- Apply techniques to reduce exposure to sources of radiation for patients and personnel.
- Evaluate the design of radiologically safe equipment, processes and environments.
- Maintain a radiation-safe environment for personnel and the public.
- Describe safe handling and disposal of radiopharmaceuticals.
- Explain how to safely clean up radiopharmaceutical spills and contamination.

Content

I. Regulatory Organizations

- A. ICRP
- B. MQSA
- C. NRC
- D. NCRP
- E. OSHA
- F. FDA
- G. NIH
- H. EPA

II. Basic Radiation Safety Criteria

- A. Occupational exposure
- B. Medical exposure
- C. Exposure to the general public
- D. Population exposure
- E. Dose limits

III. Radiation Detection and Measurement Devices

- A. Dose measuring devices
- B. Personnel dosimetry report

IV. Dose-Response Interactions

- A. Direct
- B. Indirect

V. Radiation Effects

- A. Acute effects
- B. Delayed effects
- C. Genetic effects

- D. Stochastic effects versus tissue reactions
- E. Fetal/child-related irradiation

VI. Expressing Cancer Risks

- A. Absolute risk
- B. Excess risk
- C. Relative risk

VII. Interaction of Ionizing Radiation with Matter

VIII. System Response to Irradiation

- A. Hematopoietic syndrome
- B. Skin
- C. GI syndrome
- D. CNS syndrome
- E. Immune system
- F. Reproductive system

IX. Personnel Dosimetry Report

- A. Exposure period
- B. Report identification of individuals
- C. Dosimeter type
- D. Exposure for the reporting period
- E. Cumulative totals (e.g., year to date, total dose equivalent)

X. Radiation Measurement Dose and Equipment

- A. Exposure - coulombs/kg
- B. Air kerma - gray
- C. Absorbed dose - gray
- D. Equivalent dose - sievert

- E. Effective dose - sievert
- F. Exposure measurement equipment

XI. Practical Techniques for Reducing Dose

- A. External radiation protection
- B. Internal radiation protection (radioactive)
- C. Radiopharmaceutical waste management

ASRT

Image Correlation with Anatomy, Physiology and Pathology

Description

This content covers methods and techniques for analyzing diagnostic images for abnormalities, anomalies and pathological conditions for communication with the supervising radiologist. The radiologist assistant may identify initial imaging findings or observations and communicate relevant details to the supervising radiologist. The radiologist assistant does not independently interpret imaging studies. Interpretations are not within the radiologist assistant scope and are distinguished from observations in that interpretations involve synthesizing imaging findings in the context of clinical histories, physical examination findings, laboratory testing and comparison with other imaging studies in a manner that leads to clinical impressions or conclusions, specific diagnoses and medical decision-making.

Objectives

- Implement a systematic method or technique for observing patient images to recognize normal anatomical and physiological appearances and variations that may indicate pathology or injury for communication with the supervising radiologist.
- Recommend additional images or alternative imaging procedures for diagnostic purposes.
- Formulate initial observations for the supervising radiologist in accordance with ACR Practice Guidelines for Communication of Diagnostic and Imaging Findings.
- Identify the key components and terminology of the ACR Reporting and Data Systems (RADS) for various examinations (e.g., BI-RADS, TI-RADS).

Content

- I. Thorax Imaging: Adult and Pediatric**
 - A. Cardiovascular imaging assessment
 - B. Pulmonary imaging assessment
 - C. Breast and axilla imaging assessment
 - D. Clinical presentation related to differential diagnosis
 - E. Correlation of image findings with disease and injury
 - F. MQSA Requirements
- II. Musculoskeletal Imaging: Adult and Pediatric**
 - A. Musculoskeletal imaging assessment
 - B. Clinical presentation related to differential diagnosis
 - C. Correlation of image findings with disease and injury
 - D. Imaging signs of abuse
- III. Endocrine Imaging: Adult and Pediatric**
 - A. Endocrine imaging assessment
 - B. Clinical presentation related to differential diagnosis
 - C. Correlation of image findings with disease and injury
- IV. Gastrointestinal (GI) and Hepatobiliary Imaging: Adult and Pediatric**
 - A. GI and hepatobiliary imaging assessment
 - B. Clinical presentation related to differential diagnosis
 - C. Correlation of image findings with disease and injury
- V. Neurological Imaging: Adult and Pediatric**
 - A. Neurological imaging assessment
 - B. Clinical presentation related to differential diagnosis
 - C. Correlation of image findings with disease and injury
- VI. Urinary and Reproductive Imaging: Adult and Pediatric**

- A. Urinary and reproductive imaging assessment
- B. Clinical presentation related to differential diagnosis
- C. Correlation of image findings with disease and injury

VII. Vascular and Lymphatic Imaging: Adult and Pediatric

- A. Vascular and lymphatic imaging assessment
- B. Clinical presentation related to differential diagnosis
- C. Correlation of image findings with disease and injury

ASRT

Clinical Pathways Related to Best Practice Imaging

Description

This content introduces clinical pathways as multidisciplinary plans of best clinical practice. These pathways are for specific groups of patients with a particular diagnosis and aid the coordination and delivery of high-quality care. Clinical pathway components include a timeline, the categories of care or activities and their interventions, intermediate and long-term outcome criteria, as well as the variance record. Clinical pathways differ from practice guidelines, protocols and algorithms, as they are used by a multidisciplinary team and focus on quality and coordination of care.

Objectives

- Define clinical pathways.
- Justify the use of clinical pathways in the patient care setting.
- Compose a model clinical pathway related to a radiologic diagnostic or therapeutic procedure.
- Implement clinical pathways in practice.
- Identify criteria for evaluating clinical pathways.
- Explain variance analysis as it relates to clinical pathway assessment.
- Analyze clinical pathway variance.
- List the outcomes created through the implementation of clinical pathways in imaging.
- Explain the relationship between clinical pathways and quality improvement in imaging.

Content

I. Clinical Pathway Definition

- A. Alternative phrases
 - 1. Care maps or paths
 - 2. Collaborative plans of care
 - 3. Multidisciplinary action plans
 - 4. Anticipated recovery paths

- B. Features
 - 1. Patient outcomes
 - 2. Timeline
 - 3. Collaboration
 - 4. Comprehensive aspects of care

II. Rationale for Clinical Pathways

- A. Patient benefits

- B. Health care provider benefits

- C. Health care agency/system benefits

- D. Cost-effective health care delivery benefits

III. Clinical Pathway Development Plan

- A. Identification of expected patient outcomes

- B. Clinical pathway selection
 - 1. High-volume, high-cost, high-risk procedures
 - 2. Problem-prone procedures
 - 3. Insurance denials
 - 4. Quality improvement initiatives

IV. Clinical Pathways in Imaging

- A. Patient condition

- B. Radiologist expertise

- C. Equipment availability

- D. Clinical presentation

- E. Procedure necessity for care plan

- F. Sequencing of imaging

G. ACR Appropriateness Criteria

H. Radiation exposure

V. Clinical Pathway Implementation Plan

A. Personnel involvement

B. Institution policy review

C. Contribution to patient care

VI. Clinical Pathway Evaluation Plan

A. Variance analysis

B. Outcomes analysis (i.e., infection rates, complication rates, morbidity and mortality rates)

ASRT

Communication of Findings and Validation of Clinical Practice

Description

This content introduces guidelines for communicating initial observations made by the radiologist assistant during procedures and image assessments to the supervising radiologist. The radiologist assistant's role focuses on the systematic analysis of clinical practice, including the diagnosis and treatment, resources, evidenced-based decision making, procedures, resulting outcomes and the patient's quality of life. The radiologist assistant does not independently interpret imaging studies. Interpretations are not within the radiologist assistant's scope and are distinguished from observations in that interpretations involve synthesizing imaging findings in the context of clinical histories, physical examination findings, laboratory testing and comparison with other imaging studies in a manner that leads to clinical impressions or conclusions, specific diagnoses and medical decision-making.

Objectives

- Communicate initial observations to the supervising radiologist based on practice guidelines.
- Communicate radiologist's findings and interpretation to appropriate health care personnel consistent with established guidelines.
- Identify the legal components of a report of findings following diagnostic testing.
- Establish and evaluate benchmarks as they apply to diagnostic imaging.
- Justify the need for clinical audits.
- Identify audit schemes applied to the clinical setting.
- Identify measurement criteria and instruments employed during a clinical audit.
- Explain how sensitivity and specificity measurements apply to diagnostic imaging.
- Differentiate positive and negative predictive values in the results of diagnostic imaging.
- Discuss sampling and biases on the internal and external validity of audits of diagnostic accuracy.
- Participate in institutional and health care team practice reviews (e.g., tumor board, case conferences).

Content

I. Clinical Reporting

- A. Legal considerations and requirements

- B. Initial observations report
 - 1. Composing
 - 2. Recording
 - 3. Archiving

- C. Communicating radiologist's interpretation to other health care personnel
 - 1. ACR policies on Communication of Diagnostic Imaging Findings
 - 2. HIPAA

II. Evaluation of Diagnostic Accuracy

- A. Benchmarks

- B. Sensitivity and specificity

- C. Predictive values

- D. Prior probability

- E. Bias

III. Clinical Audit

- A. Rationale

- B. Audit schemes
 - 1. External quality assessment
 - 2. Internal quality assessment
 - 3. Accreditation
 - 4. Clinical governance (e.g., credentialing)

- C. Audit categories
 - 1. Access
 - 2. Process
 - 3. Output
 - 4. Outcome
 - 5. Use of resources

- D. Measurement criteria and instruments (e.g., ACR Appropriateness Criteria)

Research and Professional Development

Description

This content enhances inquiry, professional growth and research skills in support of evidence-based practice. Learning research skills and conducting research projects benefits both individuals and the profession. The individual benefits by acquiring new knowledge and skills while the profession benefits from an increased body of knowledge. To meet this professional obligation, radiologist assistants review and synthesize professional literature and conduct research.

Objectives

- Develop research skills.
- Analyze the validity of references.
- Enhance professional knowledge and clinical performance through research and self-reflection.
- Evaluate current trends in health care and medical imaging.
- Improve patient care and clinical outcomes through integration and dissemination of evidence-based research.
- Apply ethical principles and legal requirements of professional research.
- Conduct a comprehensive literature review to identify best practices.
- Critique research results for bias and study validity.

Content

I. Intellectual Inquiry and Research Analysis

- A. Source and quality of publications
- B. Relevance of background
- C. New knowledge created
- D. Application of new knowledge
- E. Research design
- F. Research bias and study validity
 - 1. Significance tests
 - 2. Confidence intervals
- G. Application for future research and recommendations
- H. Implications for evidence-based professional practice
- I. Bibliography/reference documentation

II. Conducting Research

- A. Ethical principles and legal consideration
- B. Research plan
- C. Qualitative and quantitative research
- D. Types of research design
 - 1. Literature review
 - 2. Experimental
 - 3. Descriptive/survey research
 - 4. Case study projects
 - 5. Randomized clinical trials

Legal and Professional Standards

Description

This content provides a background in the legal and regulatory issues of modern health care environments. Advanced legal terminology, concepts and principles will be presented, discussed and applied in relation to clinical practice. Basic concepts of patient information management are included, as well as medical records management, privacy and regulatory issues.

Objectives

- Differentiate civil and criminal law.
- Explain the process of civil procedures.
- Describe legal doctrines, negligence and malpractice.
- Define the concept of standard of care.
- Distinguish among the different types of consent.
- Describe the patient's, employer's and employee's legal responsibilities.
- Discuss regulatory and accreditation issues related to health care.
- Describe Joint Commission standards for accountability and protection of patient information.
- List the requirements of a consent document.
- Discuss privacy and regulatory issues related to patient information.
- Apply the Health Insurance Portability and Accountability Act (HIPAA) to patient information systems.
- Identify potential abuses of confidential patient information.
- Adhere to health information and medical informatics policies and procedures.
- Apply the ASRT Practice Standards and ARRT Standards of Ethics.

Content

I. Scope of Practice

II. Practice Standards

III. Legal Issues

- A. Civil law (e.g., malpractice, defamation of character, negligence)
 - 1. Torts
 - a. Intentional
 - b. Unintentional
- B. Criminal law
 - 1. Assault and battery
 - 2. False imprisonment

IV. Civil Procedures

- A. Pleadings
- B. Summons and complaint
- C. Discovery
- D. Evidence
- E. Motions
- F. Trial procedure
- G. Evidence
- H. Verdict
- I. Appeals

V. Standard of Care

- A. Scope of practice and practice standards
- B. State statutes
- C. Institutional policy
- D. AHA Patient Care Partnership (Patient's Bill of Rights)
- E. ACR Practice Parameters and Technical Standards

VI. Legal Doctrines

- A. Burden of proof
- B. Res ipsa loquitur
- C. Respondeat superior
- D. Personal liability
- E. Good Samaritan law
- F. Foreseeability
- G. Borrowed servant

VII. Consent

- A. Informed
- B. Uninformed
- C. Implied
- D. Patient surrogate for consent

VIII. Patient Directives

- A. Living wills and advanced directives
- B. Do-not-resuscitate/Do-not-attempt-resuscitation (DNR/DNAR) orders
- C. Power of attorney for health care

IX. Employer and Employee Responsibilities

- A. Labor laws
- B. Unions
- C. Discrimination laws
- D. Harassment in the workplace
- E. Conditions of employment
- F. Liability coverage
- G. Equipment operation and safety

H. Whistleblower protection

I. Risk management

X. Accreditation and Regulatory Issues

A. Purpose of accreditation

B. Education program accreditation

C. Health care facility accreditation (e.g., The Joint Commission, Det Norske Veritas, American College of Radiology)

D. Health care professional credentialing

E. Regulatory agencies

F. Advisory agencies

XI. Medical Record Content

A. Patient identification

B. History

C. Physical examination

D. Psychosocial needs

E. Treatment plan

F. Physician orders

G. Informed consent

H. Clinical observations

I. Progress notes

J. Consultation requests and reports

K. Surgical and invasive procedure reports

L. Diagnostic procedure reports

- M. Transplant information
- N. Diagnosis
- O. Discharge summary and instructions
- P. Living will and advance directives
- Q. Patient education
- R. Interventions
- S. Outcomes

XII. Medical Documentation

- A. Location
- B. Date
- C. Time
- D. Frequency
- E. Route
- F. Content
- G. Signature
- H. Corrections
- I. Abbreviations

XIII. Patient Information Standards

- A. Privacy issues
- B. Health Insurance Portability and Accountability Act (HIPAA)
- C. Security standards
- D. Medical informatics
 - 1. Definition of informatics
 - 2. Application in medicine
 - 3. Information systems and standards

Radiologist Assistant Regulatory and Governmental Affairs

Description

This content enhances the radiologist assistant's knowledge of state and federal regulatory processes. The process of obtaining state licensure, the enforcement of scope of practice and supervision levels are covered. Billing and coding terminology and the procedures involved in the development and amending of current procedure terminology codes will be discussed. The roles of organizations that govern and advocate for radiologist assistants, such as the American Medical Association, American College of Radiology, American Registry of Radiologic Technologists, Centers for Medicare & Medicaid Services, U.S. Department of Health and Human Services, American Society of Radiologic Technologists and Society of Radiology Physician Extenders will be explained.

Objectives

- Differentiate radiologic technology licensure boards and state medical boards.
- Contrast the scope of authority of state physician delegation acts and radiologic technology licensures.
- Identify the key components of state licensure for the radiologist assistant.
- Explain the radiologist assistant scope of practice and current procedural and diagnostic supervision levels.
- Describe the role of Centers for Medicare & Medicaid Services to the Physician Fee Schedule.
- Explain the relationship between proposed and final rules by Centers for Medicare & Medicaid Services and the Federal Register.
- Describe the connection of the Social Security Act of 1935 to current radiologist assistant practice.
- Explain the process of creating, amending and approving CPT codes and supervision levels as it pertains to the American College of Radiology and the American Medical Association.
- Define Medicare Physician Fee Schedule billing components and how they are formulated.
- Describe professional component modifiers for billing and reimbursement purposes.
- Describe the function of National Physician Identifier numbers.
- Adhere to ARRT Standards and Code of Ethics.

Content

I. State Level Regulatory Process

- A. State radiologic technologist licensure board
 - 1. Creation
 - a. Components
 - 2. Implementation
 - 3. Enforcement

- B. Physician delegation act
 - 1. Role
 - 2. Language

II. National Governing and Advocacy Bodies

- A. American College of Radiology
 - 1. Governance
 - 2. Advocacy

- B. American Medical Association
 - 1. CPT code development
- C. Centers for Medicare & Medicaid Services
 - 1. Proposed rule
 - 2. Executive order
 - 3. Federal Register
 - 4. Medicare Physician Fee Schedule (MPFS)
 - a. Fee components and equations
 - 1) Professional component
 - 2) Technical component
 - 3) Modifiers
 - 4) Surgical component
 - 5) Relative value units (RVU)
 - 6) Geographic pricing cost index (GPCI)
 - 7) Current procedural terminology (CPT)
 - 8) Centers for Medicare & Medicaid Services supervision levels
 - a) Personal
 - b) Direct
 - c) General
 - 9) National Provider Identification Number (NPI)
 - a) Role as it pertains to the radiologist assistant

- D. American Registry of Radiologic Technologists
 - 1. Advocacy
 - 2. Examination
 - 3. Ethics
 - 4. Continuing Qualifications Requirements (CQR)

- E. American Society of Radiologic Technologists
 - 1. Governance
 - 2. Practice Standards
 - 3. Curriculum

- F. Society of Radiology Physician Extenders
 - 1. Advocacy

III. Social Security Act of 1935

- A. Title XVIII

ASRT

Radiologist Preceptor Clinical Experience

Description

Preceptor clinical experience is the cornerstone in the development of the radiologist assistant. Radiologist assistant students work closely with radiologist preceptors to maximize the learning opportunities available in the clinical environment. The radiologist assistant student and radiologist preceptor collaborate to establish goals and expectations for this portion of the curriculum. A clear understanding of the degree of autonomy in the performance of diagnostic and therapeutic procedures and the radiologist assistant's contribution to the radiologist's final diagnosis of these procedures is essential to the clinical experience.

Prerequisite or Corequisite

Radiologist assistants and students must obtain certification in advanced cardiac life support (ACLS) to work in the patient care setting.

Objectives

- Demonstrate competence in performing diagnostic and therapeutic procedures according to departmental, institutional, governmental and professional standards under the preceptorship of a radiologist.
- Provide initial observations and outcomes of examinations for review, interpretation and approval by the supervising radiologist.
- Assess, evaluate and formulate priorities in daily practice.
- Establish patient-centered and clinically effective service delivery strategies.
- Assess patient condition before, during and after procedures.
- Employ radiation protection standards.
- Engage in quality improvement practices and programs.
- Apply effective written, oral and nonverbal communication with patients, health care providers and the public.
- Adapt procedure protocols to respect the personal beliefs and values of patients.
- Adhere to the radiologist assistant practice standards, state regulations and institutional policies.
- Assess psychological and physical changes in patient condition and formulate appropriate responses.
- Recognize cultural and physical differences that influence patient compliance with procedural requirements.
- Provide psychosocial support to the patient and family during professional interactions.
- Document care in the patient's medical record in accordance with institutional and legal guidelines.

Administration and Management of Radiopharmaceuticals

Description

This content identifies common radiopharmaceuticals used for diagnostic imaging procedures (e.g., sentinel lymph node injection, cisternography). The scope of radiologist assistant practice varies by region, and regulatory guidelines and facility policies must be consulted before these procedures are performed. Safe handling and disposal practices for radiopharmaceuticals used in diagnostic imaging are also included.

Note: State statutes, regulations and accreditation standards may limit the professionals permitted to use radiopharmaceuticals.

Objectives

- List regulatory requirements for radiopharmaceuticals.
- Identify organizations that set standards for radiation safety and radiopharmaceuticals.
- Identify an Authorized User and procedures for which they can provide supervision to the radiologist assistant.
- Explain the duties of the radiation safety officer and their role in procedures performed by radiologist assistants.
- Describe the indications, contraindications, administration and adverse effects associated with radiopharmaceuticals.
- Determine the appropriate use of radiopharmaceuticals based on patient factors and procedural requirements.
- Describe safe handling and disposal of radiopharmaceuticals.
- Explain how to safely clean up radiopharmaceutical spills and contamination.
- Discuss patient counseling and recommended follow-up care for patients undergoing a procedure using radiopharmaceuticals.

Content

I. Compliance

- A. National Council on Radiation Protection and Measurements
- B. National Regulatory Commission
- C. Radiation Safety Officer
- D. Authorized User
- E. Regulatory requirements (e.g., state, facility)

II. Common Radiopharmaceuticals

III. Safe Handling

- A. Radiation detection equipment
- B. Shields and labels
- C. Personal monitoring devices

IV. Safe Administration

- A. Order verification
- B. Dose verification
- C. Verification of pregnancy status
- D. Verification of lactation/breastfeeding status
- E. Administration routes

V. Safe Disposal

VI. Decontamination of Spills

- A. Major spills
- B. Minor spills
- C. Documentation

VII. Documentation of Administration and Patient Outcomes

VIII. Postprocedure Guidelines

A. Patient safety

B. Half-life

IX. Postprocedure Complications

ASRT

Resources

This list of resources is a sample of the many references and study materials available for medical imaging. The resources list should be viewed as a snapshot of available materials and is subject to change over time. Omission of any one title is not intentional. The creation of literature and media related to the field is dynamic, and educators are encouraged to locate additional sources for updates, revisions and additions to this collection of titles.

Textbooks

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Appendix A

Curriculum Revision Work Group

We would like to extend special recognition to the outstanding professionals who volunteered their time as members of the curriculum revision project:

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