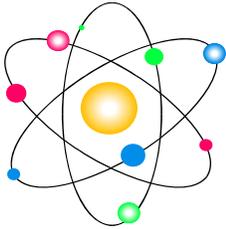


GUIDE TO LIMITED RADIOLOGIC TECHNOLOGIST TRAINING REQUIREMENTS



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IDPH GUIDE FOR TRAINING LIMITED TECHNOLOGISTS

1. INTRODUCTION

The Iowa Department of Public Health (IDPH) has established the minimum certification standards for diagnostic radiography technologists. The intent of this guide should aid in making application for an approved training program. It will also assist in developing the curriculum, associated training, and testing materials for approved course of study. Training programs may be conducted by teaching institutions as a group or by a facility as one-on-one.

DEFINITIONS (Chapter 42)

“Diagnostic radiographer” means an individual, other than a licensed practitioner, podiatric radiographer, or dental assistant with radiography qualification, who applies X–radiation to the human body for diagnostic purposes while under the supervision of a licensed practitioner or registered nurse registered as an advanced registered nurse practitioner pursuant to Iowa Code chapter 152. The types are as follows:

“General diagnostic radiographer” applies X–radiation to any part of the human body.

“Limited diagnostic radiographer” applies X–radiation to only the following body parts: chest, extremities (upper and lower), spine, or sinus. This individual is restricted to performing radiography in that area of the facility specifically designed for X-ray. This individual may not perform pediatric radiography (children under three years of age) without additional training in pediatric radiography taken as a part of the basic limited training or a specifically approved training program (see 42.21(6)).

“Chest” is defined as the lung fields including the cardiac shadow, as taught in the approved limited radiography curriculum. Radiography of the shoulder, clavicle, scapula, ribs, thoracic spine and sternum for diagnostic evaluation of these body structures or chest radiography using anything other than a vertical cassette holder is not allowed under this body part classification for limited diagnostic radiographers. Limited diagnostic radiographers already approved in chest radiography may perform oblique, apical lordotic, and decubitus chest views under this definition upon completion of additional training approved by this agency.

“Lower extremities” refers to those body parts from the distal phalanges of the foot to the head of the femur and its articulation with the pelvic girdle as taught in the approved limited radiographer curriculum. True hip radiographs are prohibited under this category for limited diagnostic radiographers.

“Upper extremities” refers to those body parts from the distal phalanges of the hand to the head of the humerus. These projections may include the acromioclavicular or glenoid-humeral areas as taught in the approved limited radiographer curriculum. True shoulder radiography that includes both distal and proximal ends of the clavicle is prohibited under this category for limited diagnostic radiographers.

“Spine” refers to the cervical, thoracic (dorsal), lumbar vertebrae and their articulations. It may also include the sacrum or coccyx and the sacral articulation with the pelvic girdle. True pelvis radiographs performed with the image receptor positioned perpendicular to the long axis of the

torso are prohibited under this limited category. Lumbo-pelvic or full spine radiography may be performed if the long axis of the image receptor is positioned parallel with the long axis of the spine as taught in the approved limited radiographer curriculum.

“Sinus” refers to the paranasal sinuses only.

“Supervision” means responsibility for and control of quality, radiation safety and protection, and technical aspects of the application of ionizing radiation to human beings for diagnostic purposes. Indirect supervision is being physically present in the immediate vicinity and able to assist if needed. Direct supervision is physically observing and critiquing the actual procedure and giving immediate assistance if required.

2. CONTENT OF APPLICATION FOR TRAINING PROGRAM FOR TECHNOLOGISTS

- a. Any individual wishing to train an individual as a limited diagnostic radiographer must submit a training program to the agency for approval. The request must provide the following:
 - An outline of the didactic and clinical studies to meet the requirements of appendix C.
 - Listed body parts to be taught. Pediatrics for limited technologists must be specifically addressed and include anatomy, positioning, radiation protection and patient care specific to patients under age 3.
 - Proof that the instructor of a limited training program meets the following:
 - a. The principal instructor is a general radiographer holding a current Iowa permit to practice and has at least two years of current experience or is a licensed physician training in the specific area of the training program.
 - b. The on-site clinical instructor is a general radiographer holding a current Iowa permit to practice and has at least two years of current experience or is a limited radiographer holding a current Iowa permit to practice in the area of instruction and has at least two years of current experience. On-site clinical instructors shall be supervised by the principal instructor.
 - A time schedule of the training program.
 - A description of the testing to be used to determine competency of the didactic portion and the mechanism to be used to determine clinical competency. All clinical competency testing shall be conducted by the principal instructor.

Model procedures that the applicant may adopt are provided in Appendices. Or, the applicant may use the model procedures as an outline to develop alternative procedures to submit for review by the IDPH staff.

- b. Training records shall be retained for three years.

Note: Do not place into effect any portion of the training program or implement any changes until written approval from the IDPH has been received.

IDPH may review the program or conduct on-site inspections at any time.

3. FINAL TESTING OF STUDENT(S)

All individuals seeking to perform diagnostic radiography must, in addition to the training requirements, take and satisfactorily pass a written examination.

- a. Upon completion of the didactic training and clinical competencies, (and, for in-office training, a final visit from the Bureau staff) a statement of completion must be submitted (see Appendix H). The student may then apply for the certification exam. Contents specifications of the examinations are published on the American Registry for Radiologic Technologists website (www.arrt.org) or are available from the IDPH staff.
- b. IDPH contracts with the American Registry of Radiologic Technologists for the certification examination. The student can find the exam application on our website: idph.state.ia.us/eh/permits_to_practice.asp. The exam is a computer test and appointments to test are made individually. Exam results are returned in approximately 2 weeks.

SUMMARY

1. Review the appendices and decide on the curriculum for the training.
2. Complete the application and submit it to the IDPH.
3. IDPH may conduct an on-site visit before training starts.
4. IDPH will send an approval letter.
5. Train the student.
6. Submit a statement of competency to IDPH upon completion of training
7. IDPH may conduct a final on-site visit for in-office training.

After completion of training, the student must:

1. Submit testing application.
2. Take and pass certification test.
3. Apply for permit to practice.

APPENDIX A

APPLICATION FOR RADIOLOGIC TECHNOLOGIST TRAINING PROGRAM

1. TRAINING INSTITUTION NAME AND ADDRESS:
2. Person to be contacted about application: Name: _____ Phone: _____ Fax: _____
3. Individual(s) to be trained.
4. Attach the curriculum that will be followed for training program (include didactic and clinical training) or state that you will follow the model in the appendixes.
5. Individuals responsible for training program. (Attach applicable credentials from #2 of this guide).
** Signing this application also grants permission for a representative of the Bureau of Radiological Health to periodically evaluate the progress of the student by an on-site visit. ** Signing this application means the student will be directly supervised until the student's competency is documented and indirectly supervised after the student's competency is documented according to the definition of supervision.
6. Medical Director's or Physician's Signature: _____ Date: _____
7. Administrator's Signature and title: _____ Date: _____ _____ Title

APPENDIX B

SAMPLE CURRICULUM

All student(s) shall be provided with a description of the training program which includes course syllabi (didactic and clinical) with appropriate performance criteria for satisfactory completion.

I. Instructional Plan

The instructional plan must document learning experiences and curriculum sequencing to develop the necessary competencies for completion of the program. The curriculum shall include learning opportunities for students to develop personal and professional attributes and values relevant to practice.

A radiologic technologist education program should foster:

1. Development of skills in problem-solving, critical-thinking, and decision-making, in oral and written communication; in human relations; in patient services; and some familiarity of applicable medical law and ethics;
2. A commitment to make a significant contribution to the healthcare team;
3. An appreciation and respect for cultural diversity;
4. A holistic caregiver's perspective;
5. Understanding of departmental organization and function in relation to the healthcare delivery system as a whole; and
6. Understanding of the value and responsibilities entailed in being a professional.

II. Education in health and basic sciences that will provide cognitive learning experiences as a foundation to understanding and performing clinical responsibilities.

III. Academic instruction for the professional radiologic technology curriculum shall include as a minimum the following content areas:

1. Methods of patient care,
2. Radiation safety and protection,
3. Radiation physics,
4. Imaging equipment and processors/processing,
5. Medical terminology,
6. Human structure and function,
7. Radiation biology,
8. Radiographic procedures,
9. Evaluation of radiographs,
10. Computer applications for radiologic sciences,
11. Radiographic pathology, and
12. Quality Improvement.

IV. Supervised clinical education, experience, and discussions shall include the following:

1. Code of ethics/professional behavior
2. Professional communication: age, gender, disease, cultural, patient, family, etc.
3. Role of health care team members
4. Scheduling and sequencing of exams
5. Order/requisition evaluation

6. Patient assessment
7. Imaging positioning, techniques, processing, analysis
8. Patient/personnel radiation protection; error reduction
9. Competency of radiographic procedures

APPENDIX C

OUTLINE OF TRAINING TOPICS

After completing the program, each student should have attained a level of knowledge and skill to be capable of performing the following tasks.

- I. Patient preparation:
 1. verifying patient identification, determining pregnancy status, and reviewing written orders for the procedure;
 2. obtaining a pertinent history and checking for contraindications;
 3. ensuring that informed consent has been obtained when necessary;
 4. explaining the procedure to the patient;
 5. checking patient clothing and linen for objects that may cause artifacts in the images or the proposed measurements;

- II. Patient Care:
 1. acquiring adequate knowledge of the patient's medical history to understand and relate to the patient's illness and the pending procedures;
 2. providing for proper comfort and care of the patient before, during and after a procedure;
 3. establishing and maintaining good communication with each patient (i.e., making introductions, explaining the procedures, answering questions);
 4. providing functionally safe and sanitary conditions for the patient in compliance with universal protection policies;
 5. recognizing and responding to an emergency condition; and
 - a. initiating a call for assistance;
 - b. monitoring and recording physiologic data (i.e., ECG, pulse rate, respiratory rate);
 - c. administering cardiopulmonary resuscitation when necessary; and
 - d. maintaining intravenous fluids, oxygen, and other life-support assistance until an emergency code team arrives.

- III. Administrative procedures:
 1. maintaining an adequate volume of medical/surgical supplies and film to ensure that a patient procedure can be performed whenever necessary;
 2. scheduling patient procedures;
 3. determining the appropriate sequence for executing multiple procedures;
 4. maintaining appropriate records of patient reports, and other required records;
 5. revising and developing policies and procedures in conjunction with administration; and
 6. participating in the quality assurance program.

- IV. Radiation Safety:
 1. using personnel monitoring devices; and

- a. reviewing personnel exposure records in relation to maximum permissible dose limits;
- b. taking appropriate measures to reduce exposure when necessary; and
- c. notifying proper authorities of excessive exposure upon occurrence.
2. notifying appropriate authorities when changes occur in the radiation safety program;
3. reviewing and complying with regulations; and
4. maintaining required records.

V. Radiation protection procedures:

1. selecting and using proper shielding to reduce radiation exposure;
2. using proper methods of selecting technique;
3. using time, distance and shielding;
4. use of exposure reduction techniques;
5. proper use of beam restriction, filtration, positioning and image receptor systems; and
6. proper scatter control techniques (grids, air gap, reverse cassette, etc.).

VI. Understanding orders, requests and diagnostic reports:

1. Radiographic orders and requisitions – components
 - a. Procedure ordered
 - b. Patient history
 - c. Clinical information
2. Diagnostic reports
 - a. Contents
 - b. Interpretation

VII. Human structure and function

1. Anatomical nomenclature: terms of direction, body planes, and body cavities;
2. Skeletal system;
3. Muscular system;
4. Respiratory system;

VIII. Radiographic Procedures (**see appendix E**).

IX. Imaging and processing

1. Radiographic density;
2. Radiographic contrast;
3. Recorded detail;
4. Distortion;
5. Exposure latitude;
6. Beam-limiting devices;
7. Beam filtration;
8. Scatter and secondary radiation;
9. Control of exit radiation;
10. Technique formulation;
11. Exposure calculation;
12. Image receptor handling and storage;
13. Characteristics of image receptors;
14. Image receptor holders and intensifying screens;
15. Processing area considerations (location, access, lighting, safety, etc.);

16. Processing of the images;
17. Digital processing;
18. Artifacts and
19. Silver recovery.

X. Imaging equipment

1. X-ray circuit;
2. Radiographic equipment;
3. Diagnostic x-ray tubes;
4. Electronic imaging and;
5. Quality control.

XI. Image analysis

1. Imaging standards;
2. Image quality factors;
3. Procedural factors and;
4. Corrective action.

XII. Radiation Production and characteristics

1. Structure of the atom;
2. Nature of radiation;
3. X-ray production and;
4. Interaction of photons with matter;

XIII. Radiation biology

1. Biophysical events;
2. Radiation effects and;
3. Radio-sensitivity and response.

XIV. Radiographic pathology

1. Definitions/terminology;
2. Classifications (examples, sites, complications, prognosis);
3. Trauma diagnosis and;
4. Causes of disease processes (pathological, traumatic, surgical, healing, and genetic).

XV. Computers in radiologic sciences.

XVI. Permit to Practice process.

APPENDIX D

TEXTBOOKS FOR DIDACTIC RADIOLOGY TRAINING

The following text is recommended. However, you may choose another similar text.

Radiography Essentials for limited practice; Long, Frank, & Ehrlich, published by Elsevier Saunders. Both text and workbook.

APPENDIX E

RADIOGRAPHIC POSITIONS AND PROJECTIONS FOR LIMITED RADIOGRAPY

- I. Chest
 - 1. PA upright
 - 2. lateral upright
 - 3. AP supine
 - 4. lateral decubitus
- II. Extremities
 - A. Toes
 - 1. AP
 - 2. oblique
 - 3. lateral
 - B. Foot
 - 1. AP angle toward heel
 - 2. medial oblique
 - 3. lateral oblique
 - 4. mediolateral
 - 5. lateromedial
 - C. Calcaneus (Os Calcis)
 - 1. lateral
 - 2. plantodorsal, axial
 - 3. dorsoplantar, axial
 - D. Ankle
 - 1. AP
 - 2. AP mortise
 - 3. mediolateral
 - 4. oblique, 45° internal
 - 5. lateromedial
 - 6. AP stress views
 - E. Tibia, Fibula
 - 1. AP
 - 2. lateral
 - F. Knee
 - 1. AP
 - 2. lateral
 - 3. AP weight bearing
 - 4. lateral oblique 45°
 - 5. medial oblique 45°
 - 6. PA
 - G. Patella
 - 1. lateral
 - 2. supine flexion 45° (Merchant)
 - 3. PA
 - 4. prone flexion 90° (Settegast)
 - 5. prone flexion 55° (Hughston)
 - H. Femur (Distal)
 - 1. AP
 - 2. mediolateral
 - I. Fingers
 - 1. PA finger
 - 2. lateral
 - 3. oblique
 - 4. AP thumb
 - 5. oblique thumb
 - 6. lateral thumb
 - J. Hand
 - 1. PA
 - 2. lateral
 - 3. oblique
 - K. Wrist
 - 1. PA
 - 2. oblique 45°
 - 3. lateral
 - 4. PA for scaphoid
 - L. Forearm
 - 1. AP
 - 2. lateral
 - M. Elbow
 - 1. AP
 - 2. lateral
 - 3. external oblique
 - 4. internal oblique
 - 5. AP partial flexion
 - N. Humerus
 - 1. AP
 - 2. lateral
 - O. Shoulder
 - 1. AP internal & external rotation
 - 2. AP neutral
 - 3. transthoracic lateral
 - P. Scapula – no
 - Q. Clavicle – no
 - R. Acromioclavicular joints

III. Skull/sinuses

A. Paranasal sinuses

1. lateral
2. PA (Caldwell)

3. parietocanthial (Waters)
4. submentovertical (full basal)
5. open mouth parietoacanthial (Waters)

_____+

IV. Spines

A. Cervical spines

1. AP angle cephalad
2. AP open mouth
3. lateral
4. anterior oblique
5. posterior oblique
6. lateral swimmers
7. lateral flexion and extension

B. Thoracic spine

1. AP
2. lateral, breathing
3. lateral, expiration

C. Lumbar spines

1. AP
2. PA
3. lateral
4. L5-S1 lateral spot
5. posterior oblique 45°
6. anterior oblique 45°
7. AP L5-S1, 30-35° cephalad
8. AP right and left bending
9. lateral flexion and extension

D. Sacrum and coccyx

1. AP sacrum 15-25° cephalad
2. AP coccyx, 10-20° caudad
3. lateral sacrum and coccyx, combined
4. lateral sacrum or coccyx, separate

E. Sacroiliac joints

1. AP
2. posterior oblique
3. anterior oblique

F. Scoliosis series

AP/PA scoliosis series (Ferguson)

APPENDIX F

Limited Radiography Clinical Evaluation Test

Patient Name: _____ Date of Exam: _____

Radiographic procedure: _____

- _____ Correlates patient ID and requisition
- _____ Correctly prepares patient for the exam ordered
- _____ Explains the exam and treats the patient in a professional manner
- _____ Positions the patient with 100% accuracy
- _____ Correctly aligns anatomical part to image receptor
- _____ Uses the correct SID
- _____ Collimates to the smallest possible field of view
- _____ Demonstrates correct usage of shielding for patient, themselves and others
- _____ Correctly centers central ray to the part of interest and demonstrates tube angle
- _____ Correctly places student identification marker placed on the image receptor
- _____ Collaborates with the evaluator on technical factors for the exam ordered
- _____ Completes projections accurately and in a timely manner
(there is a maximum time limit of 2 minutes for each position)
- _____ Completes examination and sends images to the proper place
- _____ Pass _____ Repeat

COMMENTS: _____

Student's signature _____ Date _____

Evaluator's Signature: _____ Date: _____

