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**AFSC 4R0X1/A/B/C
 DIAGNOSTIC IMAGING
 CAREER FIELD EDUCATION AND TRAINING PLAN**

Summary: These changes are applicable to the electronically published 4R0X1/A/B/C CFETP, dated 18 March 2024, and are effective immediately.

1. Please make pen/ink changes to the Phase II proficiency codes for the tasks listed in the table below.

Page	Paragraph/Line	Old Phase I	New Phase I
41	Line Item 7.6.	2b	B

Page	Paragraph/Line	Old Phase II	New Phase II
41	Line Item 7.6.	3c	-
42	Line Item 9.6.	2a	b
45	Line Item 12.2.6.	2a	b

Page	Paragraph/Line	Old Line Item	New Line Item
47	Line Item 12.6.6.	Line Item 12.6.6.	Line Item 12.6.5.
47	Line Item 12.6.7.	Line Item 12.6.7.	Line Item 12.6.6.
47	Line Item 12.6.8.	Line Item 12.6.8.	Line Item 12.6.7.

Page(s)	Header	Old Line Item	New Line Item
61 - 69	A 3 Skill Level	(1) Course	(1) Phase I
61 - 69	A 3 Skill Level	(2) CDC	(2) Phase II
73 - 75	A 3 Skill Level	(1) Course	(1) Phase I
73 - 75	A 3 Skill Level	(2) CDC	(2) Phase II

Page	Training References Added
82	ACR Manual on Contrast Media (2023 ed. or later) (n.d.-a).
82	ACR Manual on MR Safety version 1.0 (2020 or later). (n.d.-b).

2. Remove and replace the attached page inserts numbered 41, 42, 45, 46, 61 – 69, 73 – 75 and 83. Due to administrative oversight, the proficiency codes were incorrectly identified, and training line numbers were misnumbered. Also, the Phase I and Phase II headers for the Nuclear Medicine (A-shred) and Diagnostic Medical Sonography (B-shred) were mislabeled. Lastly, two training references were left off of the Magnetic Resonance Imaging (C-shred) prior to publication of the 4R0X1/A/B/C CFETP.

3. Page Inserts: 17

4. After necessary action, file this sheet in the back of the CFETP.

BY ORDER OF THE SECRETARY OF THE AIR FORCE

OFFICIAL

ROBERT I. MILLER
Lieutenant General, USAF, MC, SFS
Surgeon General

Attachment:
4R0X1/A/B/C CFETP Inserts

1. Tasks, Knowledge and Technical References	2. Core Tasks	3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Trg Start	Trg Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase I	(1) Course	(2) CDC	(1) Course	(2) CDC
7.1. Radiation physics							B	-	-	-	-	-
7.2. X-Ray imaging systems							B	-	-	-	-	-
7.3. X-Ray production							B	-	-	-	-	-
7.4. Operate fixed radiographic equipment							2b	3c	-	-	-	-
7.5. Operate mobile radiographic equipment							2b	3c	-	-	-	-
7.6. Radiobiology							B	-	-	-	-	-
7.7. Beam Restriction							2b	3c	-	-	-	-
7.8. Control scatter radiation							2b	3c	-	-	-	-
7.9. Grids							A	-	-	-	-	-
7.10. Select prime exposure factors							2b	3c	-	-	-	-
7.11. Image quality evaluation							B	-	-	-	-	-
7.12. Digital radiography												
7.12.1. Computed radiography (CR)							B	-	-	-	-	-
7.12.2. Direct Radiography (DR)							B	-	-	-	-	-
7.12.3. Acquire images using digital radiography							2b	3c	-	-	-	-
7.13. Digital imaging process concepts							B	-	-	-	-	-
7.14. Process digital images							2b	3c	-	-	-	-
7.15. Fluoroscopy							B	-	-	-	-	-
8. ANATOMY, PHYSIOLOGY, AND PATHOLOGY TR: Tortora, G. J., & Derrickson, B. H. (2020). <i>Principles of anatomy and physiology</i> , 16th Ed. Wiley; Ettinger, A. G. & Burch, P. F. (2007). <i>Medical terminology: For health careers</i> , 2nd ed. Paradigm Publishing. Callaway, W. J. (2022). <i>Mosby's comprehensive review of radiography: The complete study guide and career planner</i> , (8th Ed. or later Ed.) Mosby.												
8.1. Medical Terminology												
8.1.1. Root, prefix, and suffix							B	-	-	-	-	-
8.1.2. Common medical terms							B	-	-	-	-	-
8.2. Body Planes and Positioning							B	-	-	-	-	-

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		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase I	(1) Course	(2) CDC	(1) Course	(2) CDC
8.3. Organization of the body							B	-	-	-	-	-
8.4. Structure, function, and pathology of body systems												
8.4.1. Osteology							B	-	-	-	-	-
8.4.2. Muscular							B	-	-	-	-	-
8.4.3. Respiratory							B	-	-	-	-	-
8.4.4. Cardiovascular							B	-	-	-	-	-
8.4.5. Digestive							B	-	-	-	-	-
8.4.6. Urinary							B	-	-	-	-	-
8.4.7. Nervous							B	-	-	-	-	-
8.4.8. Endocrine							B	-	-	-	-	-
8.4.9. Reproductive							B	-	-	-	-	-
9. CONTRAST MEDIA ADMINISTRATION TR: Ehrlich, R. A., & Daly, J. A. (2009). <i>Patient care in radiography: With an introduction to medical imaging</i> , 7th Ed. Mosby Elsevier; Lampignano, J. P. & Bontrager, K. L. (2014). <i>Textbook of radiographic positioning and related anatomy</i> , 8th Ed. Mosby Elsevier; Callaway, W. J. (2022). <i>Mosby's comprehensive review of radiography: The complete study guide and career planner</i> , 8th Ed. Mosby; Rollins, J. H., Long, B. W., Smith, B. J., & Curtis, T. (2022). <i>Merrill's atlas of radiographic positioning and procedures</i> , 1-3, 15th Ed. Mosby. Callaway, W. J. (2022).												
9.1. Properties of Contrast Media							B	-	-	-	-	-
9.2. Administer contrast media												
9.2.1. Oral							a	b	-	-	-	-
9.2.2. Rectal							a	b	-	-	-	-
9.2.3. Intravenous							a	b	-	-	-	-
9.3. Perform venipuncture							a	2b	-	-	-	-
9.4. Document contrast media administration (charting medications)							a	2b	-	-	-	-
9.5. Contrast media reactions							B	-	-	-	-	-
9.6. Perform contrast-media reaction procedures							-	b	-	-	-	-

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		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase I	(1) Course	(2) CDC	(1) Course	(2) CDC
12.2. Contrast media administration TR: Ehrlich, R. A., & Daly, J. A. (2009). <i>Patient care in radiography: With an introduction to medical imaging</i> , 7th Ed. Mosby Elsevier; Lampignano, J. P. & Bontrager, K. L. (2014). <i>Textbook of radiographic positioning and related anatomy</i> , 8th Ed. Mosby Elsevier; Rollins, J. H., Long, B. W., Smith, B. J., & Curtis, T. (2022). <i>Merrill's atlas of radiographic positioning and procedures, 1-3</i> , 15th Ed. Mosby. Callaway, W. J. (2022). <i>Mosby's comprehensive review of radiography: The complete study guide and career planner</i> , (8th Ed. or later Ed.) Mosby.												
12.2.1. Oral						a	-	-	-	-	-	-
12.2.2. Rectal						a	-	-	-	-	-	-
12.2.3. Intravenous						a	-	-	-	-	-	-
12.2.4. Perform venipuncture						a	2b	-	-	-	-	-
12.2.5. Document contrast media administration (charting medications)						a	2b	-	-	-	-	-
12.2.6. Perform contrast-media reaction procedures						-	b	-	-	-	-	-
12.2.7. Prepare contrast media						-	2a	-	-	-	-	-
12.2.8. Assess patients for contraindications prior to contrast administration	5					-	-	-	-	-	-	-
12.3. Image Formation												
12.3.1. Imaging Parameters						-	-	-	-	-	-	-
12.3.2. Methods Of Data Acquisition						A	-	-	-	-	-	-
12.3.3. Image Reconstruction						-	-	-	-	-	-	-
12.3.4. Post Processing						-	-	-	-	-	-	-
12.3.5. Attenuation Coefficient						A	-	-	-	-	-	-
12.3.6. Data Processing						A	-	-	-	-	-	-
12.4. Image Evaluation and Archiving												
12.4.1. Image Display						-	-	-	-	-	-	-
12.4.2. Image Quality						-	-	-	-	-	-	-
12.4.3. Artifact Recognition And Reduction						-	-	-	-	-	-	-
12.5. CT Cross-Sectional Anatomy												

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		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase I	(1) Course	(2) CDC	(1) Course	(2) CDC
12.5.1. Head	5						A	-	-	-	-	-
12.5.2. Neck	5						A	-	-	-	-	-
12.5.3. Chest	5						A	-	-	-	-	-
12.5.4. Abdomen	5						A	-	-	-	-	-
12.5.5. Pelvis	5						A	-	-	-	-	-
12.5.6. Spine							A	-	-	-	-	-
12.5.7. Extremities							-	-	-	-	-	-
12.5.8. Vascular							-	-	-	-	-	-
12.5.9. Pathology							-	-	-	-	-	-
12.6. Scanner Operation												
12.6.1. Start CT Unit	5						-	2b	-	-	-	-
12.6.2. Shutdown CT Unit	5						-	2b	-	-	-	-
12.6.3. Perform Emergency Shutdown	5						-	2b	-	-	-	-
12.6.4. Perform Tube Warm-Up	5						-	2b	-	-	-	-
12.6.5. Transmit CT Images	5						-	2b	-	-	-	-
12.6.6. Perform CT Quality Assurance Tests	5						-	2b	-	-	-	-
12.6.7. Operate Power Injector	5						-	2b	-	-	-	-
12.7. Image Display												
12.7.1. Geometric, Distance, or Region of Interest (ROI) Measurements							-	-	-	-	-	-
12.7.2. Multiplanar Reconstruction (MPR)	5						1a	-	-	-	-	-
12.7.3. 3D Rendering (MIP, SSD, VR)							-	-	-	-	-	-
12.7.4. Retrospective Reconstruction with Different Parameters (E.G., DFOV, Algorithm, Slice Thickness)	5						1a	-	-	-	-	-
12.8. Quality Assurance and Quality Control												
12.8.1. Perform Calibration Checks	5						2b	-	-	-	-	-
12.8.2. CT Number and Standard Deviation (Water Phantom)							-	-	-	-	-	-
12.9. Obtain Images of The:												

1. Tasks, Knowledge and Technical References	2. Core Tasks	3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
1. NUCLEAR MEDICINE (A-shred)												
1.1. Bone scan imaging												
1.1.1. Obtain three phase images	5						b	3c	-	-	-	-
1.1.2. Obtain whole body planar images	5						b	3c	-	-	-	-
2. ENDOCRINE IMAGING												
2.1. Obtain thyroid images	5						b	3c	-	-	-	-
2.2. Assess thyroid uptake	5						b	3c	-	-	-	-
2.3. Obtain metastatic thyroid images							b	2b	-	-	-	-
2.4. Obtain parathyroid images							b	2b	-	-	-	-
2.5. Obtain adrenal images							b	1b	-	-	-	-
3. CENTRAL NERVOUS SYSTEM IMAGING												
3.1. Obtain planar brain scan images							a	1a	-	-	-	-
3.2. Obtain brain flow images							a	1a	-	-	-	-
3.3. Obtain brain death images							a	1a	-	-	-	-
3.4. Evaluate shunts							a	1a	-	-	-	-
3.5. Obtain cerebral spinal fluid (CSF) cisternography images							a	1a	-	-	-	-
4. PULMONARY IMAGING												
4.1. Obtain perfusion images	5						b	3c	-	-	-	-
4.2. Obtain ventilation or Aerosol images	5						b	3c	-	-	-	-
4.3. Obtain quantitative (split lung) images							b	3c	-	-	-	-
5. GASTROINTESTINAL AND HEPATOBILIARY IMAGING												
5.1. Obtain liver images	5						b	3c	-	-	-	-
5.2. Obtain spleen images							b	3c	-	-	-	-
5.3. Assess hepatobiliary function (ejection fraction: EF)	5						b	3c	-	-	-	-
5.4. Gastroesophageal imaging												
5.4.1. Assess gastric emptying	5						b	3c	-	-	-	-

1. Tasks, Knowledge and Technical References	2. Core Tasks	3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
5.4.2. Evaluate esophageal transit							a	b	-	-	-	-
5.4.3. Evaluate gastroesophageal reflux							a	b	-	-	-	-
5.4.4. Obtain GI bleed images	5						b	3c	-	-	-	-
5.4.5. Detect Meckel's diverticulum							a	2b	-	-	-	-
6. TUMOR AND INFECTION IMAGING												
6.1. Obtain Gallium-67 images	5						a	3c	-	-	-	-
6.2. Obtain Iodine-131 MIBG images	5						a	3c	-	-	-	-
6.3. Obtain Indium-111 Monoclonal antibodies; white blood cells (MABS) images							a	3c	-	-	-	-
6.4. Obtain Indium-111 WBC images	5						a	3c	-	-	-	-
6.5. Obtain breast images							a	1a	-	-	-	-
6.6. Obtain lymphoscintigraphic images							a	2b	-	-	-	-
6.7. Obtain sentinel node images							a	3b	-	-	-	-
7. RENAL AND GENITOURINARY IMAGING												
7.1. Obtain Renal imaging	5						a	3c	-	-	-	-
7.2. Assess renogram	5						b	3c	-	-	-	-
7.3. Compute glomerular filtration rate	5						b	3c	-	-	-	-
7.4. Compute effective renal plasma flow rate	5						b	3c	-	-	-	-
7.5. Obtain diuretic interventional renographic images							b	3c	-	-	-	-
7.6. Obtain ACE-inhibitor interventional renographic images							b	1b	-	-	-	-
7.7. Obtain dynamic perfusion images	5						b	3c	-	-	-	-
7.8. Evaluate transplant function							a	2b	-	-	-	-
7.9. Obtain renal cortical images	5						b	3c	-	-	-	-
7.10. Obtain voiding cystourethrogram images							a	1b	-	-	-	-
7.11. Obtain testicular images							a	-	-	-	-	-
8. PLANAR CARDIAC IMAGING												
8.1. Obtain myocardial perfusion images	5						b	3c	-	-	-	-

1. Tasks, Knowledge and Technical References	2. Core Tasks	3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
8.2. Obtain infarct avid images	5						a	3c	-	-	-	-
8.3. Gated blood pool imaging												
8.3.1. Acquire resting multiple gated images	5						b	3c	-	-	-	-
8.3.2. Acquire stress multiple gated images	5						a	3c	-	-	-	-
8.3.3. Compute ejection fraction	5						b	3c	-	-	-	-
8.4. Radionuclide ventriculography												
8.4.1. Explain first-pass study							a	b	-	-	-	-
8.4.2. Detect left-to-right shunting							a	b	-	-	-	-
8.4.3. Detect right-to-left shunting							a	b	-	-	-	-
9. SINGLE PHOTON EMISSION COMPUTED TOMOGRAPHY (SPECT) PROCEDURES												
9.1. Obtain cardiac images	5						b	3c	-	-	-	-
9.2. Obtain gated myocardial perfusion images	5						b	3c	-	-	-	-
9.3. Administer pharmacologic cardiac stress test	5						b	3c	-	-	-	-
9.4. Obtain bone images	5						b	3c	-	-	-	-
9.5. Obtain abdomen images							a	2b	-	-	-	-
9.6. Obtain thoracic images							a	2b	-	-	-	-
9.7. Obtain brain images							a	2b	-	-	-	-
9.8. Obtain liver and spleen images							a	2b	-	-	-	-
10. OTHER IMAGING METHODS												
10.1. Obtain positron emission tomography (PET) images	5						a	2b	-	-	-	-
10.2. Obtain PET/CT images	5						a	2b	-	-	-	-
10.3. Obtain SPECT/CT images	5						a	-	-	-	-	-
10.4. Obtain MRI fusion images							a	-	-	-	-	-
11. NON-IMAGING NUCLEAR LABORATORY PROCEDURES												
11.1. Conduct Schilling's test							a	-	-	-	-	-

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		A	B	C	D	E	3 Skill Level		5 Skill Level		7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
11.2. Perform therapy procedures												
11.2.1. Administer Phosphorus-32 therapy							a	-	-	-	-	-
11.2.2. Administer Strontium-89 palliative therapy							a	-	-	-	-	-
11.2.3. Administer Yttrium-90 therapy								-	-	-	-	-
11.2.4. Administer Lutathara (Lutetium-177) therapy								-	-	-	-	-
11.2.5. Administer Iodine-131 hypothyroidism therapy												
11.2.5.1. Instruct patients							b	3c	-	-	-	-
11.2.5.2. Instruct staff							b	3c	-	-	-	-
11.2.6. Administer Iodine 131 ablative therapy												
11.2.6.1. Prepare room							a	2b	-	-	-	-
11.2.6.2. Instruct patients							a	2b	-	-	-	-
11.2.6.3 Instruct staff							a	2b	-	-	-	-
11.2.6.4 Assess patient release levels							a	2b	-	-	-	-
11.2.6.5 Decontaminate room							a	2b	-	-	-	-
11.3 Radiopharmacy procedures TR: Fundamentals of Nuclear												
11.3.1 Apply radiopharmaceutical safety techniques	5						2b	3c	-	-	-	-
11.3.2 Radionuclide generator												
11.3.2.1 Operate radionuclide generator							2b	3c	-	-	-	-
11.3.2.2 Shield radionuclide generator							2b	3c	-	-	-	-
11.3.2.3 Apply elution technique							2b	3c	-	-	-	-
11.3.2.4 Extract radiation from wet-dry column							2b	3c	-	-	-	-
11.3.2.5 Conduct molybdenum assay							2b	3c	-	-	-	-
11.3.2.6 Conduct aluminum ion testing							2b	3c	-	-	-	-
11.3.3 Prepare radiopharmaceutical kit												
11.3.3.1 Apply aseptic technique	5						b	3c	-	-	-	-

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		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
11.3.3.2 Maintain quality control	5						b	3c	-	-	-	-
11.3.4 Operate dose calibrator	5						b	3c	-	-	-	-
11.3.5 Radiopharmaceutical handling												
11.3.5.1 Handle radiopharmaceuticals	5						b	3c	-	-	-	-
11.3.5.2 Radioactive receipt methods												
11.3.5.2.1 Inspect package	5						b	3c	-	-	-	-
11.3.5.2.2 Monitor package	5						b	3c	-	-	-	-
11.3.5.2.3 Maintain receipt logs	5						b	3c	-	-	-	-
11.3.6 Radiopharmaceutical storage and disposal												
11.3.6.1 Monitor decay in storage	5						b	3c	-	-	-	-
11.3.6.2 Package radiopharmaceuticals	5						b	3c	-	-	-	-
11.3.6.3 Survey disposed radiopharmaceuticals	5						b	3c	-	-	-	-
11.3.6.4 Dispose radiopharmaceuticals	5						b	3c	-	-	-	-
11.3.6.5 Transfer radiopharmaceuticals							b	2b	-	-	-	-
11.3.7 Radiopharmaceutical safety												
11.3.7.1 Operate survey instruments	5						b	3c	-	-	-	-
11.3.7.2 Conduct swipe test analysis	5						b	3c	-	-	-	-
11.3.7.3 Use syringe shields	5						b	3c	-	-	-	-
11.3.7.4 Label radiopharmaceuticals	5						b	3c	-	-	-	-
11.3.8 Inject radiopharmaceuticals	5						b	3c	-	-	-	-
11.3.9 Blood cell labeling techniques												
11.3.9.1 Prepare in vivo labeling							a	2b	-	-	-	-
11.3.9.2 Prepare modified in vitro labeling							a	1b	-	-	-	-
11.3.9.3 Prepare in vitro labeling	5						a	3c	-	-	-	-
11.3.10 Compute staff bioassay	5						b	3c	-	-	-	-
11.3.11 Dose calculations												
11.3.11.1 Calculate radiopharmaceutical dose	5						2b	3c	-	-	-	-

1. Tasks, Knowledge and Technical References	2. Core Tasks	3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
		A	B	C	D	E	3 Skill Level		5 Skill Level		7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
11.3.11.2 Calculate pharmaceutical dose	5						2b	3c	-	-	-	-
12 NUCLEAR MEDICINE SAFETY												
12.1 Prepare a personnel dosimetry program							a	-	-	-	-	-
12.2 Secure lab	5						b	3c	-	-	-	-
12.2.1 Renew material license							a					
12.2.2 Amend material license							a					
12.2.3 Renew material permit							a					
12.2.4 Amend material permit							a					
12.3 Determine radioactive material shielding requirements							2b	3c	-	-	-	-
12.4 Prepare radiation accident protocol							b	1b	-	-	-	-
12.5 Prepare misadministration protocol							b	1b	-	-	-	-
12.6 Post Nuclear Regulatory Commission (NRC) notices							b	1b	-	-	-	-
12.7 NRC compliance												
12.7.1 Code of Federal Regulations (CFR) Title 10, Part 19							B	-	-	-	-	-
12.7.2 CFR Title 10, Part 20							B	-	-	-	-	-
12.7.3 CFR Title 10, Part 35							B	-	-	-	-	-
12.8 Area survey procedures												
12.8.1 Conduct weekly swipe test	5						b	3c	-	-	-	-
12.8.2 Conduct daily contamination survey	5						b	3c	-	-	-	-
13. UPTAKE PROBE QUALITY CONTROL												
13.1. Calibrate uptake probe							2b	3b	-	-	-	-
13.2. Determine sensitivity							2b	3b	-	-	-	-
13.3. Determine crystal resolution							2b	3b	-	-	-	-
13.4. Compute chi-square results							2b	3b	-	-	-	-
13.5. Assess linearity							2b	3b	-	-	-	-
13.6. Gamma camera quality control												
13.6.1 Acquire intrinsic field data	5						b	3c	-	-	-	-

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		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
13.6.2. Acquire extrinsic field data	5						1a	3c	-	-	-	-
13.7. Field artifacts	5						A	-	-	-	-	-
13.7.1. Determine sensitivity	5						1a	3c	-	-	-	-
13.7.2. Determine uniformity	5						1a	3c	-	-	-	-
13.7.3. Determine system resolution							a	3c	-	-	-	-
13.7.4. Detector												
13.7.4.1. Calibrate energy							a	3c	-	-	-	-
13.7.4.2. Calibrate linearity							a	3c	-	-	-	-
13.7.4.3. Calibrate isotope peak (multiple window)	5						a	3c	-	-	-	-
13.8. SPECT/CT*												
13.8.1. Assess center of rotation	5						a	3c	-	-	-	-
13.8.2. Determine resolution							a	3c	-	-	-	-
13.8.3. Determine sensitivity								-	-	-	-	-
13.9. Dose calibrator												
13.9.1. Assess constancy	5						b	3c	-	-	-	-
13.9.2. Assess accuracy	5						b	3c	-	-	-	-
13.9.3. Assess geometry	5						b	3c	-	-	-	-
13.9.4. Assess linearity	5						b	3c	-	-	-	-
14. Nuclear medicine computer applications												
14.1. Acquire static images	5						a	3c	-	-	-	-
14.2. Acquire dynamic images	5						a	3c	-	-	-	-
14.3. Acquire gated images	5						a	3c	-	-	-	-
14.4. Acquire SPECT images	5						a	3c	-	-	-	-
14.5. Acquire SPECT gated images	5						a	3c	-	-	-	-
14.6. Image processing												
14.6.1. Format image	5						a	3c	-	-	-	-
14.6.2. Obtain filter parameters	5						a	3c	-	-	-	-

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		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
4.6.3. Measure region of interest	5						a	3c	-	-	-	-
14.6.4. Reconstruct SPECT/CT image	5						a	3c	-	-	-	-
14.6.5. Correct attenuation	5						a	3c	-	-	-	-
15. Nuclear medicine patient care TR: Patient Care in Radiography												
15.1. Patient safety							A	B	-	-	-	-
15.2. Monitor vital signs	5						2b	3c	-	-	-	-
15.3. Demonstrate lifting techniques	5						b	2b	-	-	-	-
15.4. Perform venipuncture	5						2b	3c	-	-	-	-
15.5. Employ IV precautions	5						2b	3c	-	-	-	-
15.6. Monitor patients							b	c	-	-	-	-
16. Operate patient emergency equipment (crash cart)							b	2b	-	-	-	-
17. Medication administration												
17.1. Administer oral medications: Captopril (e.g., Capoten)							a	-	-	-	-	-
17.2. Administer intramuscular medications: B-12							a	-	-	-	-	-
17.3 Intravenous medications												
17.3.1. Administer adenosine							b	3c	-	-	-	-
17.3.2. Administer furosemide (e.g., Lasix)	5						b	3c	-	-	-	-
17.3.3. Administer dobutamine							b	3c	-	-	-	-
17.3.4. Administer aminophylline	5						b	3c	-	-	-	-
17.3.5. Administer thyrogen							b	3c	-	-	-	-
17.3.6. Administer cholecystokinin (e.g., CCK)	5						b	3c	-	-	-	-
17.3.7. Administer enalapril maleate (e.g., Vasotec)							a	-	-	-	-	-
17.3.8. Administer regadenoson (e.g., Lexiscan)	5						b	3c	-	-	-	-
17.3.9. Document medication administration	5						b	3c	-	-	-	-
18. Applied Technical Mathematics												

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		A	B	C	D	E	A 3 Skill Level		B 5 Skill Level		C 7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
18.1. Solve algebraic equations							2b	3b	-	-	-	-
18.2. Solve mathematical problems using radicals/exponents							2b	3b	-	-	-	-
18.3. Solve mathematical problems using logarithms							2b	3b	-	-	-	-
18.4. Construct a linear and exponential graph to determine the physical half-life of a radionuclide							2b	3b	-	-	-	-
18.5. Utilize decay formula							2b	3b	-	-	-	-
18.6. Calculate/Process statistical data from imaging procedures							2b	3b	-	-	-	-
19. Applied Nuclear Physics												
19.1. Solve mass-energy conversions							2b	3b	-	-	-	-
19.2. Utilize decay formula							2b	3b	-	-	-	-
19.3. Solve for the decay scheme for any radionuclide to stability							2b	3b	-	-	-	-
19.4. Calculate the energy values for given particulate and electromagnetic radiation							2b	3b	-	-	-	-
20. Applied Technical Chemistry												
20.1. Solve conversions among basic systems of measurement							2b	3b	-	-	-	-
20.2. Configure the electron configuration of elements reflecting the change in valence states							-	-	-	-	-	-
20.3. Solve conversions among molecules, atoms, or grams of a substance							-	-	-	-	-	-
20.4. Formulate inorganic compounds and their chemical formulas							-	-	-	-	-	-

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		A	B	C	D	E	3 Skill Level		5 Skill Level		7 Skill Level	
		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
1. DIAGNOSTIC MEDICAL SONOGRAPHY (B-shred)												
1.1. Principles of diagnostic ultrasound												
1.1.1. Practical physics												
1.1.2. Instrumentation												
1.1.3. Artifacts												
1.1.4. Safety												
1.1.5. Doppler physics												
1.1.6. Vascular physics												
1.1.7. 3D/4D Physics												
1.1.8. Ethics												
2. BASIC OPERATING PROCEDURES												
2.1. Adjust sonographic instrumentation												
2.2. Adjust image display												
2.3. Record ultrasound image												
2.4. Prep patient												
2.5. Apply ergonomics												
2.6. Perform 3D/4D Imaging												
2.7. Conduct equipment quality control												
2.8. Employ transducer cleaning techniques												
2.9. Interact with Patient												
2.10. Interact with radiologist												
3. SONOGRAPHIC ANATOMY AND PHYSIOLOGY												
3.1. Abdomen												
3.2. Pelvis												
3.3. Extremities												
3.4. Testicular												
3.5. Breast												

1. Tasks, Knowledge and Technical References	2. Core Tasks	3. Certification For OJT					4. Proficiency Codes Used To Indicate Training/Information Provided (See Note)					
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		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
3.6. Thyroid							B	-	-	-	-	-
3.7. Vascular							A	-	-	-	-	-
3.8. Obstetrics							B	-	-	-	-	-
4. PEDIATRIC												
4.1. Neonatal brain							-	a	-	-	-	-
4.2. Spine							-	-	-	-	-	-
4.3. Hips							-	-	-	-	-	-
5. SONOGRAPHY IMAGING												
5.1. Obtain aorta images	5						2b	3c	-	-	-	-
5.2. Obtain liver images	5						2b	3c	-	-	-	-
5.3. Obtain gallbladder and biliary images	5						2b	3c	-	-	-	-
5.4. Obtain pancreas images	5						2b	3c	-	-	-	-
5.5. Obtain urinary system images	5						2b	3c	-	-	-	-
5.6. Obtain spleen images	5						2b	3c	-	-	-	-
5.7. Obtain abdominal Doppler data							a	2b	-	-	-	-
5.8. Obtain gastrointestinal (GI) tract images							a	-	-	-	-	-
6. PELVIS												
6.1. Obtain transabdominal images	5						2b	3c	-	-	-	-
6.2. Obtain endovaginal images	5						1b	3c	-	-	-	-
7. OBSTETRICAL												
7.1. Obtain first trimester images	5						2a	2b	-	-	-	-
7.2. Obtain second and third trimester images							1a	2b	-	-	-	-
8. PERIPHERAL VASCULAR												
8.1. Obtain upper extremity vascular images	5						1b	2c	-	-	-	-
8.2. Obtain lower extremity vascular images	5						1b	2c	-	-	-	-
8.3. Obtain carotid artery images							1b	2c	-	-	-	-
8.4. Obtain thyroid images	5						2b	3c	-	-	-	-
8.5. Obtain testicular images	5						1b	3c	-	-	-	-

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		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Phase I	(2) Phase II	(1) Course	(2) CDC	(1) Course	(2) CDC
8.6. Obtain breast images							1b	2b	-	-	-	-
8.7. Obtain superficial images							a	b	-	-	-	-
8.8. Obtain musculoskeletal images (MSK)							a	b	-	-	-	-
9. TRANSPLANT												
9.1. Obtain Renal transplant images							a	-	-	-	-	-
9.2. Obtain liver transplant images							a	-	-	-	-	-
9.3. Provide invasive procedure assistance							a	-	-	-	-	-
10. PEDIATRICS												
10.1. Obtain neonatal head images							a	-	-	-	-	-
10.2. Obtain neonatal spine images							-	-	-	-	-	-
10.3. Obtain neonatal hips							-	-	-	-	-	-
11. PATHOLOGY												
11.1. Abdomen							B	-	-	-	-	-
11.2. Pelvis							B	-	-	-	-	-
11.3. Extremities							B	-	-	-	-	-
11.4. Testicular							B	-	-	-	-	-
11.5. Breast							B	-	-	-	-	-
11.6. Thyroid							B	-	-	-	-	-
11.7. Vascular							B	-	-	-	-	-
11.8. Obstetrics							B	-	-	-	-	-
11.9. Neonatal head							A	-	-	-	-	-
11.10. Musculoskeletal							A	-	-	-	-	-
11.11. Superficial Structures							A	-	-	-	-	-

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		Tng Start	Tng Complete	Trainee Initials	Trainer Initials	Certifier Initials	(1) Course	(2) CDC	(1) Course	(2) CDC	(1) Course	(2) CDC
13.5. Chemical Mis-registration							B	-	-	-	-	-
13.6. Truncation							B	-	-	-	-	-
13.7. Magnetic Susceptibility							B	-	-	-	-	-
13.8. Cross-Talk							B	-	-	-	-	-
13.9. Zipper							B	-	-	-	-	-
13.10. Shading							B	-	-	-	-	-
13.11. Moire							B	-	-	-	-	-
13.12. Magic Angle							B	-	-	-	-	-

Training Reference (TR) Source Summary for STS 4R0X1C, Magnetic Resonance Imaging

List of commercial and service publications

Note. Most commercial training references are listed in the following format: Author(s), year of publication, title, edition (if applicable), and publisher. Some non-government publications published by organizations are updated quite often, and these may not include edition numbers, year of publication, or an author. Government publications are listed per that department’s naming convention. Later or earlier editions of the same publications are acceptable after evaluation.

The following publications apply to all sections of this STS table for 4R0X1C:

Kelley, L. & Petersen, C.M. (2013). *Sectional Anatomy for Imaging Professionals* (3rd ed. or later ed.) Elsevier.

Elsevier. Westbrook, C., Talbot, J., & Roth, C. K. (2011). *MRI in Practice* (4th ed. or later ed.). Malden, Massachusetts: Wiley-Blackwell.

Westbrook, C. (2016). *MRI at a Glance* (3rd ed. or later). John Wiley & Sons Inc.

ACR Manual on Contrast Media (2023 ed. or later) (n.d.-a).

ACR Manual on MR Safety version 1.0 (2020 or later). (n.d.-b).