



Nuclear Medicine Technology

Certification and registration requirements for nuclear medicine technology are based on the results of a comprehensive practice analysis conducted by The American Registry of Radiologic Technologists® (ARRT®) staff and the Practice Analysis and Continuing Qualifications Requirements (CQR) Advisory Committee. The purpose of the practice analysis is to identify job responsibilities typically required of staff nuclear medicine technologists at entry into the profession. In 2015 the ARRT surveyed a large, national sample of nuclear medicine technologists. The results of the practice analysis are reflected in this document. The purpose of the task inventory is to list or delineate those responsibilities. The task inventory is the foundation for both the clinical competency requirements and content specifications.

Basis of Task Inventory

The practice analysis survey was used to identify the activities typically required of staff nuclear medicine technologists. When evaluating survey results, the advisory committee applied a 40% guideline. That is, to be included on the task inventory, an activity must have been the responsibility of at least 40% of staff technologists. The advisory committee could include an activity that did not meet the 40% criterion if there was a compelling rationale to do so (e.g., a task that falls below the 40% guideline but is expected to rise above the 40% guideline in the near future).

Application to Clinical Competency Requirements

The purpose of the clinical competency requirements is to verify that candidates have completed fundamental clinical procedures in nuclear medicine technology. Successful performance of these fundamental procedures, in combination with mastery of the cognitive knowledge and skills covered by the nuclear medicine technology examination, provides the basis for acquisition of the full range of skills required in a variety of settings. An activity must appear on the task inventory to be considered for inclusion in the clinical competency requirements. For an activity to be designated as a mandatory requirement, survey results had to indicate that the vast majority of nuclear medicine technologists performed that activity. The advisory committee designated clinical activities performed by fewer technologists or which are carried out only in selective settings, as elective. The clinical competency requirements are available at arrt.org and appear in the *Nuclear Medicine Technology Certification and Registration Handbook*.

Application to Content Specifications

The purpose of the Nuclear Medicine Technology Examination is to assess the knowledge and cognitive skills underlying the intelligent performance of the tasks typically required of staff technologists at entry into the profession. The content specifications identify the knowledge areas underlying performance of the tasks on the task inventory. Note that each activity on the task inventory is followed by a content category that identifies the section of the content specifications corresponding to that activity. The content specifications are available at arrt.org and appear in the *Nuclear Medicine Technology Certification and Registration Handbook*.



Content Categories

Legend: PC = Patient Care,
S = Safety, IP = Image Production,
P = Procedures

Activity

1. Ensure appropriate sequence for multiple procedures and interact with appropriate health care personnel regarding special orders.	PC.1.A.2.A.
2. Inspect inventory of radiopharmaceuticals, pharmaceuticals, and supplies to ensure that adequate quantities are available to complete scheduled procedures.	P.1.
3. Verify the accuracy, appropriateness, and completeness of the patient requisition form.	PC.1.A.2.A.
4. Prepare room and equipment to provide safe and sanitary conditions for each patient.	PC.1.E.
5. Verify patient identification.	PC.1.A.2.A.
6. Maintain confidentiality of patient information.	PC.1.A.
7. Explain procedure to patient, give patient necessary instructions, and answer patient's questions.	PC.1.B.
8. Obtain pertinent medical history, including any previous imaging procedures, to assist in performing the study and physician interpretation.	PC.1.B.
9. Check pertinent lab values (e.g., TSH, bilirubin, β HCG, creatinine) before imaging.	P.2., P.3, P.4, P.5.
10. Check for allergies and contraindications based upon pertinent patient history.	PC.1.D.
11. Determine the possibility of pregnancy or nursing for female patients of child-bearing age prior to administration of radiopharmaceutical.	S.1.D.3., P.2., P.3, P.4, P.5.
12. Utilize proper technique in patient transfer.	PC.1.C.
13. Place electrocardiographic (ECG) leads on patient for cardiac imaging.	P.2.
14. Observe patient during imaging to detect motion.	PC.1.A.2.D., P.2., P.3., P.4., P.5.
15. Utilize appropriate immobilization techniques to limit motion during imaging.	PC.1.A.2.D.
16. Monitor patient drains and tubing (e.g., IVs, urinary catheter bag, oxygen supply).	PC.1.C.2.
17. Assess patient's vital signs during the imaging process when necessary.	PC.1.C.3.
18. Administer emergency medical action to patient in distress.	PC.1.D.
19. Verify completion of documentation for procedures.	P.2., P.3., P.4., P.5.
20. Follow standard precautions.	PC.1.E.3.
21. Use sterile or aseptic techniques.	PC.1.E.2.
22. Dispose of biohazardous waste according to regulations.	S.1.G.3., S.1.H.



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23. Take appropriate measures to minimize radiation exposure to patient (i.e., Image Wisely®, Image Gently®).	S.1.
24. Use appropriate precautions to minimize occupational radiation exposure (i.e., ALARA).	S.1.
25. Post appropriate signs in radiation areas.	S.1.F.3.C.
26. Perform radiation surveys and wipe tests in indicated areas and record as prescribed by governing regulations.	S.1.F.
27. Manage radioactive spills to reduce risk of contamination.	S.1.F.4.
28. Report a medical event according to governing regulations.	S.1.E.
29. Order appropriate unit dose from radiopharmacy.	P.1.A., P.1.C.2.
30. Perform required procedures for receipt and return of radioactive materials.	S.1.G.
31. Prepare and store radiopharmaceutical/pharmaceutical as directed in the kit instructions provided by the manufacturer or according to department protocol.	P.1.C.
32. Label and record radiopharmaceutical/pharmaceutical indicating date, type, activity, concentration, and other data as required by governing regulations.	P.1.C.
33. Store radioactive material in appropriate shielding.	S.1., P.1.C.3.A.3.
34. Check all radiopharmaceutical preparations for color and clarity.	P.1.C.1.C.4.
35. Determine radiopharmaceutical required to perform study.	P.1.B., P.2, P.3., P.4. P.5.
36. Verify that the radiopharmaceutical is correct for the procedure to be performed prior to administering the dose.	P.1.C.3.
37. Determine appropriate dosage to be administered.	P.1.C.2.
38. Withdraw the appropriate volume of radiopharmaceutical using aseptic technique and radiation safety precautions.	P.1.C.2.
39. Verify activity to be administered using a dose calibrator.	IP.1.B.
40. Administer oral dose of radiopharmaceutical.	P.1.C.3.C.1.
41. Administer intravenous injection of radiopharmaceutical.	P.1.C.3.C.1.
42. Administer or assist in the administration of interventional pharmaceuticals (e.g., Lugol solution, Regadenoson, morphine).	P.2., P.3., P4.
43. Observe patient for adverse reactions to radiopharmaceutical or other medications.	P2., P.3., P.4., P.5.
44. Record patient and radiopharmaceutical information to comply with regulatory requirements.	P.1.C.3.



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45. Store and/or dispose of radioactive waste according to regulations.	S.1.H.
46. Deface radioactive labels and survey all containers that no longer contain radioactive material.	S.1.G.
47. Calibrate scintillation well counter to appropriate photopeak using a radioactive source.	IP.1.C.1.A.
48. Determine the efficiency of the scintillation well counter to calculate the disintegrations per minute.	IP.1.C.2.B.2.
49. Perform constancy test on a survey meter with a check source.	IP.1.A.2.
50. Perform constancy test on a dose calibrator.	IP.1.B.2.A.2.
51. Perform accuracy test on a dose calibrator.	IP.1.B.2.A.1.
52. Perform linearity test on a dose calibrator.	IP.1.B.2.A.3.
53. Perform geometry test on a dose calibrator.	IP.1.B.2.A.4.
54. Perform quality control on an uptake probe.	IP.1.C.
55. Calibrate uptake probe to appropriate photopeak using radioactive source.	IP.1.C.
56. Peak gamma camera to appropriate photopeak using radioactive point or sheet source.	IP.1.E.
57. Prepare radioactive sources/phantoms for gamma camera quality control using radiation safety precautions.	IP.1.E.2.B.1.
58. Perform uniformity test on a gamma camera using a radioactive source.	IP.1.E.2.B.1.
59. Perform spatial linearity and resolution tests of a gamma camera using radioactive source and appropriate phantom.	IP.1.E.2.B.
60. Perform center of rotation test on a SPECT system.	IP.1.E.2.B.8.
61. Perform high count uniformity correction on a gamma camera according to manufacturer's guidelines.	IP.1.E.2.B.2.
62. Perform tomographic resolution/uniformity test using appropriate SPECT phantom.	IP.1.E.2.B.9.
63. Perform PET scanner quality control.	IP.1.F.2.
64. Perform CT scanner quality control.*	IP.1.F.5.
65. Interpret results of instrumentation quality control tests to assure that performance standards are met.	IP.1.
66. Initiate corrective action for deficiencies demonstrated on instrumentation quality control tests.	IP.1.
67. Record and maintain results of instrumentation quality control tests to comply with governing regulations.	IP.1.

*CT is for attenuation correction/anatomic localization only, diagnostic CT is not assessed.



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68. Monitor equipment to detect and report malfunctions during imaging.	IP.1.E., IP.1.F.
69. Prepare radioactive gas delivery systems in accordance with regulations.	IP.1.D.
70. Prepare radioactive aerosol systems in accordance with regulations.	IP.1.D.
71. Process images.	IP.1.G.
72. Evaluate patient images for technical quality.	P.2., P.3., P.4., P.5.
73. Transfer images to PACS or other archival system.	IP.1.G.3.
74. Restore electronic images from long-term archive.	IP.1.G.3.
75. Annotate images with information necessary for identification and interpretation.	P.2., P.3., P.4., P.5.
Set-up equipment and position patient to obtain the following DIAGNOSTIC PROCEDURES:	
76. Infection and Inflammation	P.5.A.
BONE	
77. Planar/Whole Body	P.5.B.
78. 3-Phase	P.5.B.2.
79. SPECT or SPECT/CT	P.5.B.4.
80. PET or PET/CT	P.5.B.5.
BRAIN	
81. Planar	P.5.C.
82. Flow	P.5.C.1.
83. SPECT or SPECT/CT	P.5.C.2.
84. PET or PET/CT	P.5.C.3.
85. CSF Cisternography	P.5.C.4.
86. Shunt Patency	P.5.C.5.
CARDIAC	
87. Gated Blood Pool	P.2.A.
88. Myocardial Perfusion with Attenuation Correction	P.2.B.
89. Myocardial Perfusion	P.2.B.
90. PET or PET/CT	P.2.C.
GASTROINTESTINAL	
91. Gastric Emptying	P.4.A.



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92. Gastroesophageal Reflux	P.4.B.
93. Meckel Diverticulum Detection	P.4.C.
94. GI Bleed	P.4.D.
GENITOURINARY	
95. Renal Function	P.4.I.
96. Renal Function with Pharmacological Intervention (e.g., Diuretic, ACE Inhibitor)	P.4.I.
97. Renal Morphology	P.4.J.
98. Renal SPECT or SPECT/CT	P.4.J.
99. Radionuclide Cystogram	P.4.K.
LIVER	
100. Hepatobiliary Function	P.4.E.
101. Damaged RBC Spleen	P.4.G.
102. RBC Hemangioma with SPECT or SPECT/CT	P.4.F.
103. Liver/Spleen Planar	P.4.H.
104. Liver/Spleen SPECT or SPECT/CT	P.4.H.
LUNG	
105. Ventilation - Gas	P.5.D.2.
106. Ventilation - Aerosol	P.5.D.2.
107. Perfusion	P.5.D.1.
108. Quantitative	P.5.D.3.
LYMPHOSCINTIGRAPHY	
109. Sentinel Node	P.3.B.4.
ENDOCRINE	
110. Parathyroid (Planar)	P.3.A.2.
111. Parathyroid SPECT or SPECT/CT	P.3.A.2.
112. Thyroid Uptake	P.3.A.1.
113. Thyroid Imaging	P.3.A.1.
TUMOR	
114. Planar/Whole Body	P.3.B.1.
115. Tumor SPECT or SPECT/CT	P.3.B.2.
116. Tumor PET or PET/CT	P.3.B.3.



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Administer or Assist with the Administration of the following THERAPEUTIC PROCEDURES:	
117. Thyroid Therapy/Ablation	P.3.C.1.B., P.3.C.1.C
118. Selective Internal Radiation Therapy (SIRT) with Hepatic Artery Perfusion Study (HAPS)	P.3.C.1.E.
119. Palliation of Bone Pain	P.3.C.1.A.
120. Non-Hodgkin Lymphoma	P.3.C.1.D.
Perform the Following:	
121. CT for Attenuation Correction/Anatomic Correlation with SPECT or PET	P.2., P.3., P.4., P.5.