



Vascular Sonography

Certification and registration requirements for vascular sonography are based on the results of a comprehensive practice analysis conducted by The American Registry of Radiologic Technologists (ARRT) staff and the Sonography/Vascular Sonography Practice Analysis Committee. The purpose of the practice analysis is to identify job responsibilities typically required of vascular sonographers at entry into the profession. The results of the practice analysis are reflected in this document. The attached task inventory is the foundation for clinical competency requirements, clinical experience requirements, and content outline, which, in turn, is the foundation for the content specifications and CQR SSA content specifications.

Basis of Task Inventory

In 2021, the ARRT surveyed a large, national sample of vascular sonographers to identify their responsibilities. When evaluating survey results, the committee applied a 40% criterion. That is, to be included on the task inventory, an activity must have been performed by at least 40% of vascular sonographers. The 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% criterion in the near future).

Application to Clinical Competency Requirements

The purpose of the clinical competency requirements is to document that individuals have demonstrated competence performing the clinical activities fundamental to a particular discipline. Competent performance of these fundamental activities, in conjunction with mastery of the cognitive knowledge and skills as documented by the examination requirement, provides the basis for acquisition of the full range of procedures typically required in a variety of settings. Demonstration of clinical competence means that the candidate has performed the procedure independently, consistently, and effectively during the course of their formal education.

Application to Clinical Experience Requirements

The purpose of the clinical experience requirements is to document that candidates have performed a subset of the clinical procedures within a discipline. Successful performance of these fundamental procedures, in combination with mastery of the cognitive knowledge and skills as documented by the examination requirement, provides the basis for the acquisition of the full range of clinical skills required in a variety of settings.

An activity must appear on the task inventory to be considered for inclusion in the clinical competency or clinical experience requirements. If an activity is designated as a mandatory requirement, survey results had to indicate that vascular sonographers performed that activity. The committee may designate clinical activities performed by fewer vascular sonographers, or which are carried out only in selected settings, as elective. The *Vascular Sonography Didactic and Clinical Requirements* and the *Vascular Sonography Clinical Experience Requirements* are available from ARRT's website (www.arrt.org).

Application to Content Specifications

The purpose of the examination requirement is to assess whether individuals have obtained the knowledge and cognitive skills underlying the intelligent performance of the tasks typically required in vascular sonography for practice at entry level. The content specifications identify the knowledge areas underlying performance of the tasks on the task inventory. Every content category can be linked to one or more activities 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 *Vascular Sonography Content Specifications* are available from ARRT's website (www.arrt.org).

*The abbreviation "e.g.," is used to indicate that examples are listed in parentheses, but that it is not a complete list of all possibilities.



Content Categories

PC = Patient Care,
IP = Image Production,
P = Procedures,
FOQ = Focus of Questions

Activity

1. Schedule patients taking into consideration the length of the procedure, the patient's condition, age, and preparation for the examination. PC.1.B.3.
2. Sequence imaging procedures to avoid affecting subsequent examinations. PC.1.B.3.D.
3. Verify the patient's identity. PC.1.A.2.A.
4. Manage interpersonal interactions in an effective manner. PC.1.B.
5. Evaluate patient's ability to understand and comply with the requirements for the requested examination (e.g., need for medical interpreter, physical, sensory, or cognitive impairments). PC.1.B.2.
6. Obtain pertinent medical history. PC.1.B.
7. Recognize abnormal or missing lab values relative to the examination ordered. P.FOQ.
8. Explain and confirm the patient's preparation (e.g., diet restrictions, preparatory medications, allergies) prior to the examination. PC.1.B.3.B., PC.1.H.1.
9. Review the examination request to verify the order is accurate, appropriate, and complete. PC.1.A.2.A.
10. Explain procedure to patient, patient's family, or authorized representative (e.g., pre-examination instructions). PC.1.B.3.A.
11. Respond as appropriate to examination inquiries from the patient, patient's family, or authorized representative (e.g., scheduling delays, examination duration, other imaging modalities, clinical decision support). PC.1.B.3.
12. Provide for the patient's safety, comfort, and modesty. PC.1.C.
13. Monitor the patient's auxiliary medical equipment (e.g., IVs, supplemental oxygen). PC.1.C.2.
14. Demonstrate and promote professional and ethical behavior (e.g., confidentiality, regulation compliance). PC.1.A.
15. Notify appropriate personnel of adverse events or incidents (e.g., patient fall, wrong patient imaged). PC.1.A.2.
16. Communicate relevant information to appropriate care team. PC.1.G.5.
17. Communicate critical findings to the interpreting physician. PC.1.D.6., PC.1.G.5.
18. Use positioning aids as needed, to enhance the examination and promote patient comfort and/or safety. PC.1.A.2.D.
19. Use proper ergonomics when performing sonographic exams to prevent work-related musculoskeletal disorders. PC.1.C.1., PC.1.C.4.
20. Practice Standard Precautions. PC.1.E.3.
21. Follow appropriate transmission-based precautions. PC.1.E.4., PC.1.E.5.



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- | | |
|--|---------------------------|
| 22. Obtain vital signs (e.g., pulse, blood pressure) when appropriate. | PC.1.C.3.A. |
| 23. Recognize and communicate the need for prompt medical attention. | PC.1.D. |
| 24. Recognize the need for and administer emergency care. | PC.1.D. |
| 25. Follow environmental protection standards for handling and disposing of bio-hazardous materials (e.g., sharps, body fluids). | PC.1.E.3.D. |
| 26. Follow environmental protection standards for handling and disposing hazardous materials (e.g., disinfectants). | PC.1.F. |
| 27. Clean, disinfect, or sterilize transducer and equipment. | PC.1.E.2. |
| 28. Use sterile or aseptic technique when indicated. | PC.1.E., PC.1.H.4. |
| 29. Verify that informed consent is obtained as necessary. | PC.1.A.1.A.,
PC.1.H.3. |
| 30. Verify that a time-out procedure is performed when necessary. | PC.1.H.2. |
| 31. Provide follow-up instructions to the patient, patient's family, or authorized representative. | PC.1.H.6. |
| 32. Explain breathing instructions as needed for obtaining optimal images. | PC.1.B.3.A. |
| 33. Handle, label, and submit laboratory specimens (e.g., biopsy tissue). | PC.1.H.5. |
| 34. Communicate effectively with patient care team during interventional procedures. | PC.1.G.5. |
| 35. Select equipment and accessories for the procedure requested. | IP.1. |
| 36. Monitor and adjust TGC, power, and amplification to achieve optimal image quality | IP.2. |
| 37. Minimize ultrasound bioeffects. | PC.1.G., IP.2.D. |
| 38. Review and verify patient identifiers and clinical information in clinical software (e.g., PACS, EMR) prior to procedure. | IP.3.E. |
| 39. Modify imaging techniques for circumstances such as body habitus, artifacts inherent to the patient, pathological conditions, and/or patient's inability to cooperate. | IP.3.A. |
| 40. Use annotation to indicate anatomical planes, patient position, or other relevant information. | IP.3.A.4. |
| 41. Evaluate vascular sonographic images for diagnostic quality. | IP.3. |
| 42. Evaluate vascular sonographic images for artifacts and determine if any artifact(s) have had an effect on the diagnostic quality of the examination. | IP.3.A.3. |
| 43. Take corrective measures if vascular sonographic images are not of diagnostic quality. | IP.3.A.5. |



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- | | |
|--|------------------------|
| 44. During the vascular procedure, obtain representative images demonstrating normal anatomy, and/or variants, and/or pathological conditions. | IP.3. |
| 45. Access and review pertinent patient data (*e.g., EMR, previous procedures/reports) for correlation with vascular sonographic studies. | IP.3.E.1. |
| 46. Verify completeness of study according to facility's protocol. | IP.3.A. |
| 47. Determine if additional areas should be evaluated sonographically. | IP.3.A. |
| 48. Verify vascular procedure coding. | PC.1.A.2.A. |
| 49. Recognize and report any limitations of the vascular procedure performed. | IP.3.A. |
| 50. Communicate with the interpreting physician(s) about pertinent patient information and sonographic findings. | PC.1.G.5. |
| 51. Document required information in the patient's medical record (e.g., imaging procedure documentation). | PC.1.A.2.E., IP.3.E.1. |
| 52. Recognize and report malfunctions in the sonographic equipment, accessories, and PACS. | IP.1.B.3. |
| 53. Use teleradiology. | IP.3.E.2.C. |
| 54. Operate electronic imaging and record keeping systems (e.g., PACS, HIS, RIS, EMR). | IP.3.E. |
| 55. Use the following enhanced sonographic techniques:
a. volume flow (e.g., hemodialysis fistulas)
b. augmentation/provocative maneuvers for DVT.
c. augmentation/provocative maneuvers for reflux study | IP.3.C, IP.3.D. |
| 56. Select Doppler setting to achieve optimal image quality. | IP.1.A.5.B., P. FOQ. |

Following clinical protocols, position patient and transducer using appropriate technical factors to produce diagnostic vascular studies and recognize pathology (when applicable) of:

ABDOMINAL / PELVIC VASCULATURE

Arterial

- | | |
|-------------------------|----------|
| 57. aorta | P.1.A.1. |
| 58. celiac | P.1.A.2. |
| 59. hepatic | P.1.A.3. |
| 60. splenic | P.1.A.4. |
| 61. superior mesenteric | P.1.A.5. |
| 62. inferior mesenteric | P.1.A.5. |
| 63. renal | P.1.A.6. |



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- 64. common iliac
- 65. internal iliac

P.1.A.7.
P.1.A.8.

Venous

- 66. inferior vena cava
- 67. hepatic
- 68. portal
- 69. splenic
- 70. superior mesenteric
- 71. renal
- 72. common iliac
- 73. internal iliac

P.1.B.1.
P.1.B.2.
P.1.B.3.
P.1.B.4.
P.1.B.5.
P.1.B.6.
P.1.B.7.
P.1.B.8.

TRANSPLANT VASCULATURE

- 74. liver
- 75. kidney

P.1.C.1.
P.1.C.2.

ARTERIAL PERIPHERAL VASCULATURE

Upper Extremity

- 76. brachiocephalic
- 77. subclavian
- 78. axillary
- 79. brachial
- 80. radial
- 81. radial artery mapping
- 82. ulnar

P.2.A.1.
P.2.A.2.
P.2.A.3.
P.2.A.4.
P.2.A.5.
P.2.A.7.
P.2.A.6.

Lower Extremity

- 83. external iliac
- 84. common femoral
- 85. superficial femoral
- 86. profunda femoris
- 87. popliteal
- 88. tibioperoneal trunk
- 89. posterior tibial
- 90. anterior tibial

P.2.B.1.
P.2.B.2.
P.2.B.3.
P.2.B.4.
P.2.B.5.
P.2.B.6.
P.2.B.7.
P.2.B.8.



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- 91. peroneal
- 92. dorsalis pedis

P.2.B.9.
P.2.B.10.

VENOUS PERIPHERAL VASCULATURE

Upper Extremity

- 93. internal jugular
- 94. brachiocephalic
- 95. subclavian
- 96. axillary
- 97. brachial
- 98. cephalic
- 99. basilic
- 100. radial
- 101. ulnar
- 102. vein mapping

P.3.A.1.
P.3.A.2.
P.3.A.3.
P.3.A.4.
P.3.B.5.
P.3.B.6.
P.3.B.7.
P.3.B.8.
P.3.B.9
P.3.C.1.

Lower Extremity

- 103. external iliac
- 104. common femoral
- 105. femoral
- 106. profunda femoris
- 107. popliteal
- 108. great saphenous
- 109. small saphenous
- 110. calf veins
- 111. vein mapping
- 112. reflux assessment (e.g., venous insufficiency, perforators, varicose veins, valve competency)

P.3.B.1.
P.3.B.2.
P.3.B.3.
P.3.B.4.
P.3.B.5.
P.3.B.6.
P.3.B.7.
P.3.B.8.
P.3.C.1.
P.3.C.2.

EXTRACRANIAL CEREBRAL VASCULATURE

- 113. carotid artery (CCA, ICA, ECA)
- 114. vertebral artery
- 115. **STRESS/PRESSURE TESTING**
- 116. pulse volume recording (PVR)
- 117. segmental pressures – upper extremities

P.4.A.
P.4.B.

P.2.C.1.
P.2.C.2.



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- 118. segmental pressures – lower extremities
- 119. ankle-brachial index (ABI)
- 120. photoplethysmography (PPG)

P.2.C.3.
P.2.C.4.
P.2.C.5.

POST INTERVENTION

- 121. bypass grafts
- 122. endografts
- 123. dialysis access grafts/fistulae
- 124. stents
- 125. post-catheterization complications
- 126. IVC filters
- 127. TIPS
- 128. post endarterectomy

P.4.C.1.
P.4.C.2.
P.4.C.3.
P.4.C.4.
P.4.C.5.
P.4.C.6.
P.4.C.7.
P.4.C.8.

Assist with the following sonographic interventional procedure:

INTERVENTIONAL

- 129. pseudoaneurysm treatment - compression or guided thrombin injection

P.4.C.9.