



Vascular Sonography

1. Introduction

Candidates for certification and registration are required to meet the Professional Education Requirements specified in the *ARRT Rules and Regulations*. ARRT's *Vascular Sonography Didactic and Clinical Competency Requirements* are one component of the Professional Education Requirements.

The requirements are periodically updated based upon a [practice analysis](#) which is a systematic process to delineate the job responsibilities typically required of vascular sonographers. The result of this process is a [task inventory](#) which is used to develop the clinical competency requirements (see section 4 below) and the content specifications which serve as the foundation for the didactic competency requirements (see section 3 below) and the examination.

2. Documentation of Compliance

Verification of program completion, including Didactic and Clinical Competency Requirements and all degree-related requirements including conferment of the degree, will be completed on the Program Completion Verification Form on the ARRT Educator website after the student has completed the Application for Certification and Registration.

Candidates who complete their educational program during 2024 or 2025 may use either the 2021 Didactic and Clinical Competency Requirements or the 2024 requirements. Candidates who complete their educational program after December 31, 2025 must use the 2024 requirements.

~~To document that the Didactic and Clinical Competency Requirements have been satisfied by a candidate, the program director (and authorized faculty member if required) must sign the ENDORSEMENT SECTION of the Application for Certification and Registration.~~

3. Didactic Competency Requirements

The purpose of the didactic competency requirements is to verify that individuals had the opportunity to develop fundamental knowledge, integrate theory into practice and hone affective and critical thinking skills required to demonstrate professional competency. Candidates must successfully complete coursework addressing the topics listed in the [ARRT Content Specifications](#) for the Vascular Sonography Examination. These topics would typically be covered in a nationally-recognized curriculum published by organizations such as Joint Review Committee on Education in Diagnostic Medical Sonography (JRC-DMS). Educational programs accredited by a mechanism acceptable to ARRT generally offer education and experience beyond the minimum requirements specified here.

4. Clinical Competency Requirements

The purpose of the clinical competency requirements is to verify that individuals certified and registered by the ARRT have demonstrated competency 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 covered by the vascular sonography examination, provides the basis for the 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 ~~his or her~~ their formal education. The following pages identify the specific procedures for the clinical competency requirements. Candidates may wish to use these pages, or their equivalent, to record completion of the requirements. The pages do NOT need to be sent to the ARRT.



4.1 General Performance Considerations

4.1.1 Patient Diversity

Demonstration of competence should include variations in patient characteristics such as age, gender, and medical condition.

4.1.2 Simulated Performance

The ARRT requirements specify that certain clinical procedures may be simulated as designated in the specific requirements below. Simulations must meet the following criteria:

~~The candidate must competently demonstrate skills as similar as circumstances permit to the cognitive, psychomotor, and affective skills required for performing the procedures on patients;~~

~~The program director must be confident that the skills required to competently perform the simulated task will generalize or transfer to the clinical setting, and, if applicable, the candidate must evaluate related images.~~

- ARRT defines simulation of a clinical procedure routinely performed on a patient as the candidate completing hands-on tasks of the procedure on a live human being, using the same level of cognitive, psychomotor, and affective skills required for performing the procedure on a patient in a clinical setting standardized to mirror the physical facilities where practice occurs.
- ARRT requires that competencies performed as a simulation must meet the same criteria as competencies demonstrated on patients. For example, the competency must be performed under the direct observation of the program director or program director's designee and be performed independently, consistently, and effectively.
- Up to three procedures may be performed on volunteers (simulated), as long as your institution has a policy that assures the protection of both the volunteer's and the institution's interest. Procedures identified as "Patient" on the chart below **must** be performed on a patient.

4.1.3 Elements of Competence

Demonstration of clinical competence requires that the program director or the program director's designee has observed the candidate performing the procedure independently, consistently, and effectively during the course of the candidate's formal educational program.

4.2 Vascular Sonography Specific Requirements

As part of the educational program, candidates must demonstrate competence in the clinical activities identified below. These clinical activities are listed in more detail in the following sections.

- Five mandatory patient care procedures and be CPR certified;
- ~~Four~~Five mandatory scanning techniques;
- One mandatory equipment care activity;
- ~~3~~Nine mandatory imaging procedures; and
- ~~19~~Nine elective imaging procedures selected from a list of ~~13~~17 procedures.



4.2.1 Mandatory Patient Care Requirements and Scanning Techniques

Candidates are required to be CPR certified. They must also demonstrate competence in the remaining five patient care activities, ~~four~~ five scanning techniques, and one equipment care activity. The activities should be performed on patients whenever possible, but simulation is acceptable if state or institutional regulations prohibit candidates from performing the procedures on patients.

Mandatory Patient Care Procedures	Date Completed	Competence Verified By
CPR Certification		
Vital Signs (blood pressure, pulse, respiration)		
Monitoring level of consciousness and respiration		
Standard Precautions		
Sterile technique		
Verification of informed consent		
Mandatory Scanning Techniques	Date Completed	Competence Verified By
Gray Scale (2D)		
Color Doppler		
Power Doppler		
Spectral Doppler		
*Ergonomic Evaluation		
Mandatory Equipment Care	Date Completed	Competence Verified By
Clean and disinfect transducer		

**The candidate should be evaluated for appropriate ergonomic scanning techniques according to the following: “Industry Standards for the Prevention of Work Related Musculoskeletal Disorders in Sonography.”*

4.2.2 Vascular Sonographic Procedures (Studies)

Candidates must demonstrate competence in the ~~39~~ nine mandatory ~~procedures~~ studies listed in the following table. ~~For the mandatory procedures, candidates must be evaluated while scanning actual patients.~~ Candidates are also required to demonstrate competence for ~~19~~ nine of the ~~36~~ 17 elective ~~procedures~~ studies. ~~Elective~~

Where possible, all ~~procedures~~ studies should be performed on patients; however, up to ~~one-half~~ three of the 12 ~~elective procedures~~ studies that are eligible for simulation may be performed on volunteers (simulated), as long as your institution has a policy that assures the protection of both the volunteer’s and the institution’s interests. ~~Multiple competencies may be demonstrated on one patient or volunteer.~~

Competency is limited to one study per patient. The candidate’s clinical education should include variation in patient characteristics, provide ample opportunity for demonstration of both normal and variant anatomy, as well as important pathologies and medical conditions.



When performing the vascular sonography ~~procedures~~studies, the candidate must demonstrate appropriate:

- patient preparation, including evaluation of requisition or medical record, preparation of exam room, identification of patient, infection control procedures ~~(i.e., Standard Precautions)~~, patient assessment, and instruction concerning the ~~procedure~~study;
- exam protocol, including patient positioning, sonographic technique, parameter selection, image display, image annotation and labeling, archiving, and documentation of procedure; and
- image evaluation, including image quality, optimal demonstration of anatomic region and pathology, and exam completeness.
- [demonstration of the mandatory vessels listed in Appendix 1](#)



4.2.2 Vascular Sonographic Procedures (continued)

Abdomen/Pelvic Vasculature					
<i>Arterial and Venous</i>	Mandatory	Elective	Date Completed	Eligible for Simulation	Competence Verified By
Mesenteric Study		✓		✓	
Aorta	✓				
Renal Artery Stenosis	✓				
Liver Doppler/Vasculature	✓				
TIPS		✓			
Liver Transplant		✓			
Kidney Transplant		✓			
Upper Extremity Vasculature					
<i>Arterial and Venous</i>	Mandatory	Elective	Date Completed	Eligible for Simulation	Competence Verified By
Upper Extremity Arterial Doppler	✓			✓	
Upper Extremity Venous Doppler	✓				
Radial Artery Mapping		✓		✓	
Vein Mapping		✓		✓	
Lower Extremity Vasculature					
<i>Arterial and Venous</i>	Mandatory	Elective	Date Completed	Eligible for Simulation	Competence Verified By
Lower Extremity Arterial Doppler	✓			✓	
Lower Extremity Venous Doppler	✓				
Vein Mapping		✓		✓	
Lower Extremity Reflux Assessment		✓		✓	
Neck Vasculature					
	Mandatory	Elective	Date Completed	Eligible for Simulation	Competence Verified By
Carotid artery Ultrasound	✓			✓	



4.2.2 Vascular Sonographic Procedures (continued)

Stress/Pressure Testing					
	Mandatory	Elective	Date Completed	Eligible for Simulation	Competence Verified By
Segmental pressures (upper extremities)		✓		✓	
Segmental pressures (lower extremities)		✓		✓	
Ankle-Brachial Index (ABI)	✓			✓	
Toe-Brachial Index (TBI)				✓	
Pulse Volume Recording (PVR)		✓		✓	
Post-exercise testing					
Photoplethysmography (PPG)					
Post Intervention Procedures					
	Mandatory	Elective	Date Completed	Eligible for Simulation	Competence Verified By
Bypass grafts*		✓			
Post catheterization complications*		✓			
Endografts*		✓			
Dialysis access- grafts/ fistulae*		✓			
Stents*		✓			
Post endarterectomy*					
Interventional Procedures					
	Mandatory	Elective	Date Completed	Eligible for Simulation	Competence Verified By
Vein ablations*					
Pseudoaneurysm treatment (compression or guided thrombin injection)*injection) *		✓			
Total Mandatory exams required	9 of 9				
Total Elective exams required	9 of 17				
Total # Simulations allowed	3 of 12 eligible exams				

*This competency must be performed on a patient.



Appendix 1

The following is a list of studies along with the vessels to be included in each study. **REQUIRED** vessels listed must be included in the study to demonstrate clinical competence. Although **OPTIONAL** vessels are not required to be demonstrated, it is recommended that they be included in the study, when possible.

STUDY	REQUIRED VESSELS	OPTIONAL VESSELS
Aorta Ultrasound		
	aorta	inferior vena cava
	common Iliac artery	common iliac vein
Renal Artery Stenosis		
	aorta	intrarenal artery
	renal artery	
	renal vein	
	inferior vena cava	
Liver Doppler/Vasculature		
	aorta	superior mesenteric vein
	inferior vena cava	
	portal vein	
	splenic vein	
	hepatic vein	
	hepatic artery	
Mesenteric Ultrasound		
	aorta	inferior mesenteric artery
	celiac artery	splenic vein
	inferior vena cava	splenic artery
	superior mesenteric vein	
	superior mesenteric artery	
TIPS		
	hepatic artery	aorta
	hepatic vein	left portal vein
	portal vein	right portal vein
		TIPS shunt
Liver Transplant		
	aorta	
	inferior vena cava	
	portal vein	
	splenic vein	
	hepatic vein	
	hepatic artery	
	celiac artery	



Kidney Transplant		
	renal transplant artery	intrarenal artery
	renal transplant vein	renal transplant venous anastomosis
	external iliac vein	renal transplant artery anastomosis
Upper Extremity Arterial Doppler		
	subclavian artery	brachiocephalic artery
	axillary artery	
	brachial artery	
	radial artery	
	ulnar artery	
Upper Extremity Venous Doppler		
	internal jugular vein	brachiocephalic vein
	subclavian vein	
	axillary vein	
	brachial vein	
	cephalic vein	
	basilic vein	
	radial vein	
Lower Extremity Arterial Doppler		
	common femoral artery	
	superficial femoral artery	
	deep femoral artery	
	popliteal artery	
	tibioperoneal trunk	
	posterior tibial artery	
	anterior tibial artery	
	peroneal artery	
	dorsalis pedis artery	
Lower Extremity Venous Doppler		
	common femoral vein	external iliac vein
	femoral vein	small saphenous vein
	deep femoral vein	
	popliteal vein	
	greater saphenous vein	
	calf veins	
	common femoral vein	