

## Physicians' Vascular Interpretation Examination Content Outline

### (Outline Summary)

#	Domain	Subdomain	Percentage
1	Cerebrovascular	<ul style="list-style-type: none"> <li>Interpret extracranial and intracranial ultrasound studies</li> </ul>	15%
2	Abdominal	<ul style="list-style-type: none"> <li>Interpret aortoiliac ultrasound studies</li> <li>Interpret mesenteric ultrasound studies</li> <li>Interpret renal vascular studies</li> </ul>	15%
3	Peripheral Arterial – Duplex Imaging	<ul style="list-style-type: none"> <li>Interpret peripheral arterial duplex studies</li> <li>Interpret bypass graft and stent ultrasound studies</li> <li>Interpret dialysis access graft ultrasound studies</li> </ul>	20%
4	Peripheral Arterial – Physiologic	<ul style="list-style-type: none"> <li>Interpret physiologic arterial studies</li> </ul>	15%
5	Peripheral Venous	<ul style="list-style-type: none"> <li>Interpret vein mapping studies</li> <li>Interpret venous duplex studies for thrombosis/obstruction</li> <li>Interpret venous insufficiency studies</li> </ul>	20%
6	Laboratory Technology and Operations	<ul style="list-style-type: none"> <li>Physics and Instrumentation</li> <li>Patient Care and Quality Assurance</li> </ul>	15%

### (Detailed Outline)

<b>1</b>	<b>Cerebrovascular 15%</b>
<b>1.A</b>	<b>Interpret extracranial and intracranial ultrasound studies</b>
1.A.1	Assess vertebral artery
1.A.2	Grade bulb and internal carotid artery stenosis using velocity criteria
1.A.3	Assess plaque characteristics in the carotid arteries using gray scale and color
1.A.4	Evaluate the carotid artery stenosis when contralateral disease is present
1.A.5	Identify the effect of contralateral carotid artery disease on interpretation of internal carotid artery stenosis
1.A.6	Identify indirect findings for more proximal and distal disease during a carotid exam when there is a non-visualized area

1.A.7	Identify the result of cardiac disease on carotid artery waveforms
1.A.8	Assess common carotid artery
1.A.9	Assess external carotid artery
1.A.10	Identify incidental findings on cerebrovascular duplex exams
1.A.11	Assess nonatherosclerotic cerebrovascular disease within the carotid arteries
1.A.12	Assess carotid arteries after intervention, (i.e., carotid endarterectomy or stent)
1.A.13	Interpret intracranial cerebrovascular exams (e.g., identify emboli, stenosis, and vasospasm)
<b>2</b>	<b>Abdominal 15%</b>
<b>2.A</b>	<b>Interpret aortoiliac ultrasound studies</b>
2.A.1	Evaluate aneurysmal disease
2.A.2	Evaluate occlusive disease
2.A.3	Evaluate non-atherosclerotic and/or non-aneurysmal disease
2.A.4	Interpret post-endovascular aneurysm repair duplex exams
2.A.5	Use Doppler techniques to evaluate for endoleak
<b>2.B</b>	<b>Interpret mesenteric ultrasound studies</b>
2.B.1	Assess for celiac compression
2.B.2	Evaluate mesenteric arteries
2.B.3	Identify stenosis post-visceral intervention
<b>2.C</b>	<b>Interpret renal vascular studies</b>
2.C.1	Evaluate renal artery stenosis (e.g., velocity, renal aortic-ratio, resistive indices, etc.)
2.C.2	Interpret renal resistive indices to determine the presence of parenchymal renal disease
2.C.3	Evaluate non-stenotic renal artery disease (e.g., FMD, aneurysm, etc.)
2.C.4	Assess renal allografts
2.C.5	Evaluate renal vasculature post intervention
<b>3</b>	<b>Peripheral Arterial – Duplex Imaging 20%</b>
<b>3.A</b>	<b>Interpret peripheral arterial duplex studies</b>
3.A.1	Interpret peripheral arterial ultrasound studies of native vessels
3.A.2	Interpret velocity and waveform morphology within upper extremity peripheral arteries to determine stenosis
3.A.3	Interpret velocity and waveform morphology within lower extremity peripheral arteries to determine stenosis

3.A.4	Assess peripheral arteries dimensions to detect aneurysm
3.A.5	Assess for non-atherosclerotic disease within peripheral arteries
3.A.6	Assess for arterial trauma
3.A.7	Interpret arterial testing during provocative maneuvers to identify dynamic arterial obstruction
3.A.8	Identify incidental findings during peripheral arterial studies to detect non-vascular pathologies
3.A.9	Identify and treat peripheral artery pseudoaneurysms
<b>3.B</b>	<b>Interpret bypass graft and stent ultrasound studies</b>
3.B.1	Interpret peripheral arterial duplex after endovascular/minimally invasive intervention
3.B.2	Interpret duplex after bypass grafts within peripheral arteries (vein conduit and prosthetic conduit)
<b>3.C</b>	<b>Interpret dialysis access graft ultrasound studies</b>
3.C.1	Interpret pre-dialysis vascular imaging to determine access site suitability (arterial and venous)
3.C.2	Interpret post-arteriovenous access dialysis graft exam (e.g., restenosis aneurysm, patency, and complications, etc.)
3.C.3	Apply volume flow measurements when evaluating arteriovenous dialysis access
3.C.4	Use volume flow measurements of arteriovenous dialysis access to determine suitability for use in hemodialysis
<b>4</b>	<b>Peripheral Arterial – Physiologic 15%</b>
<b>4.A</b>	<b>Interpret physiologic arterial studies</b>
4.A.1	Interpret arterial Doppler waveform analysis on physiologic studies to detect arterial disease
4.A.2	Interpret upper extremities segmental pressure studies
4.A.3	Interpret lower extremities segmental pressure studies
4.A.4	Interpret pulse volume recordings of upper extremities
4.A.5	Interpret pulse volume recordings of lower extremities
4.A.6	Interpret exercise arterial studies
4.A.7	Interpret toe pressures
4.A.8	Interpret digital waveforms to detect both fixed and dynamic arterial disorders
4.A.9	Interpret provocative testing for thoracic outlet syndrome using physiologic methods
4.A.10	Interpret transcutaneous oxygen tension (TcPo <sub>2</sub> ) testing
4.A.11	Interpret Raynaud disease testing
<b>5</b>	<b>Peripheral Venous 20%</b>
<b>5.A</b>	<b>Interpret vein mapping studies</b>

5.A.1	Interpret vein mapping to determine patency, size, and suitability of use
5.A.2	Assess for anatomic venous variants related to vein mapping
<b>5.B</b>	<b>Interpret venous duplex studies for thrombosis/obstruction</b>
5.B.1	Assess upper extremity veins with compression and flow for deep vein thrombosis
5.B.2	Assess upper extremity veins with compression and flow for superficial vein thrombosis
5.B.3	Assess lower extremity veins with compression and flow for deep vein thrombosis
5.B.4	Assess lower extremity veins with compression and flow for superficial vein thrombosis
5.B.5	Assess veins and surrounding structures using venous waveforms for extrinsic venous compression
5.B.6	Assess for central venous obstruction using venous waveforms
5.B.7	Assess venous structures and flow for non-thrombotic venous disease
5.B.8	Assess venous waveforms to recognize impact of cardiac comorbidities
5.B.9	Assess inferior vena cava and iliac veins
5.B.10	Asses for anatomic variants related to the peripheral veins
<b>5.C</b>	<b>Interpret venous insufficiency studies</b>
5.C.1	Assess for superficial venous reflux
5.C.2	Assess for deep venous incompetence
5.C.3	Assess for perforating veins
5.C.4	Assess for superficial venous thrombosis during venous insufficiency testing
5.C.5	Evaluate using venous duplex following venous ablation procedures
<b>6</b>	<b>Laboratory Technology and Operations 15%</b>
<b>6.A</b>	<b>Physics and Instrumentation</b>
6.A.1	Identify bioeffects (e.g. cavitation, tissue heating)
6.A.2	Modify output power following ALARA principle
6.A.3	Recognize artifacts
6.A.4	Identify pulsed wave (spectral) Doppler waveform characteristics
6.A.5	Identify color Doppler waveform characteristics
6.A.6	Identify power Doppler waveform characteristics
6.A.7	Identify continuous wave Doppler waveform characteristics
6.A.8	Identify gray-scale characteristics

6.A.9	Select appropriate transducer for requested examination
<b>6.B</b>	<b>Patient Care and Quality Assurance</b>
6.B.1	Apply generally accepted infection control precautions and disinfectant techniques
6.B.2	Recognize and communicate critical findings to referring provider to facilitate appropriate and timely clinical management
6.B.3	Participate in quality assurance program (e.g., providing feedback regarding acquisition technique, determine agreement between preliminary and final reports)
6.B.4	Correlate findings with adjunct imaging modalities
6.B.5	Assess study indications to ensure appropriateness of selected test
6.B.6	Calculate specificity, sensitivity, predictive value, and accuracy to compare with a referenced standard