

March 15, 2021

Thomas J. Nasca, MD  
President and Chief Executive Officer, ACGME  
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401 North Michigan Avenue  
Chicago, IL 60611

Dear Dr. Nasca:

It is with great pleasure and anticipation that the vascular medicine community presents an application to ACGME for accreditation of our vascular medicine fellowship training programs.

The purpose of the specialty recognition for vascular medicine is to assure excellence in the provision of care to patients with a wide range of vascular disorders. The justification for seeking accreditation of vascular medicine as a distinct area of expertise stems from the recognition that vascular disease, per se, is the major cause of death and disability in Western Society. Millions of people are affected by peripheral vascular diseases within the U.S., and its prevalence is growing as the population ages. In addition, over the past 20 years, dramatic advances in diagnostic capabilities, genetic evaluations, pharmacotherapy, surgical techniques, and endovascular interventions have paralleled scientific discoveries in vascular biology and pathophysiology, which have, in turn, increased our understanding of peripheral atherogenesis, atherothrombosis, atherosclerotic progression, venous thrombosis, and vasculitis. As our understanding of peripheral vascular biology expands, similarities to cardiac disease versus distinct differences have emerged.

With ACGME approval, we anticipate growth of our training programs to provide an expanded workforce of dedicated vascular medicine physicians, which will foster more intensive investigation of vascular disease pathophysiology and treatment. Patients will benefit from access to vascular disease experts.

The Society for Vascular Medicine (SVM), formed in 1989, provides the organizational backbone for our field. The mission of the SVM is to promote and advance the discipline of vascular medicine and the care of patients with vascular disease by:

- Establishing standards for post-graduate training and stimulating the formation of vascular medicine training programs
- Developing educational activities including continuing medical education programs for trainees and health care providers
- Fostering research in vascular medicine and biology

● ● ● ● Society for Vascular Medicine

- Promoting interdisciplinary clinical excellence in the diagnosis and treatment of vascular disease through the creation of care standards and by engaging in quality improvement activities
- Serving an advisory role to educational institutions, government agencies, and other health care organizations (critical role in patient advocacy).

The SVM journal, *Vascular Medicine*, has been publishing high-quality, peer-reviewed articles that encompass this broad field for the past 26 years. The content of *Vascular Medicine* includes original research articles, reviews, case reports, editorials, images, and vascular disease patient information pages. The SVM formed the American Board of Vascular Medicine (ABVM) in 2003 to provide a high-stakes certification in general vascular medicine. Since the first examination in 2005, 851 physicians have become diplomates in vascular medicine. The SVM collaborates with national and international vascular surgery, interventional radiology, cardiovascular, cardiothoracic medical societies who have recognized the importance of vascular medicine expertise and perspectives on the care of patients with peripheral vascular disease.

Once again, the vascular medicine community thanks you in advance for your consideration of our application.

Sincerely,

Raghu Kolluri, MD  
President, Society for Vascular Medicine

**I. The clinical care and safety of patients will be improved through the recognition of the discipline.**

Cardiovascular disease is the leading cause of death in the United States and includes important and life-threatening peripheral vascular diseases such as peripheral artery disease (PAD), cerebrovascular disease, (causing stroke), aortic aneurysm and dissection, and venous thromboembolism (VTE, deep vein thrombosis, pulmonary embolism). According to data from the American Heart Association, it has been estimated that over 8.5 million Americans suffer from PAD, and there are approximately 1 million new VTE-events in the United States each year. [1] Chronic venous insufficiency (CVI) is reported to affect 25 million adults in the US [1]. Deaths due to ruptured aortic aneurysm or aortic dissection, while less common, remain an important preventable cause of cardiovascular mortality. [1] As the US population ages, the prevalence of peripheral vascular disease will significantly increase in the decades ahead.

There is currently an inadequate workforce of physician providers with comprehensive training in the care of patients with peripheral vascular disease. A workforce shortage of vascular surgical specialists in the United States to meet estimated growing demand has been well described. [2] In addition, workforce shortages are also projected for medical subspecialties that provide some aspects of care for patients with peripheral vascular diseases, including cardiology and hematology. [3, 4]

Vascular medicine is a unique medical specialty. Vascular medicine specialists provide diagnostic and therapeutic care across the spectrum of peripheral vascular diseases, including common entities of PAD, VTE, aortic disease, cerebrovascular disease, and chronic venous disease and lymphedema, as well as uncommon and rare diseases such as fibromuscular dysplasia, vasospastic disorders, vascular compression syndromes, vasculitis, and vascular wounds. Vascular medicine specialists can provide access to specialized vascular care for patients with suspected peripheral vascular diseases identified in a primary care setting, making a correct diagnosis, and developing a comprehensive care plan. Vascular medicine specialists can also serve as “gatekeepers” for referrals to surgery or intervention when indicated, thus preserving limited access to vascular surgical and interventional specialists for those patients in most need, considering projected workforce shortages. Vascular medicine specialists provide vascular evaluation and management from a medical perspective, especially for patients who remain high risk for other additional events. This ability of dedicated VM specialists to provide longitudinal medical care is complimentary rather than competitive. For example, for a patient with severe carotid artery stenosis, vascular medicine specialists would not only be able to confirm the diagnosis of atherosclerotic vascular disease (versus a non-atherosclerotic entity such as fibromuscular dysplasia, vasculitis, or radiation arteritis) but also determine need for referral for revascularization if indicated (carotid endarterectomy or carotid artery stenting), engage in shared decision-making with the patient regarding this referral, and can also implement a program of comprehensive guideline-directed medical therapy for atherosclerotic vascular disease including appropriate antithrombotic therapies. As treatment options increase, the pharmacotherapy decision process becomes more complex requiring greater expertise/specialization. As such, vascular medicine specialists frequently collaborate with vascular surgeons, interventional cardiologists, and other interventionalists in the care of patients with peripheral vascular disease and have been recognized as important members of multi-specialty vascular care teams, e.g., pulmonary embolism response team. [5]

Vascular medicine physicians also serve as a primary source of vascular care for patients with uncommon and rare peripheral vascular disorders for whom focused clinical expertise may not have been previously available. [6, 7] In a survey of patients seen in the outpatient vascular medicine practice of Cleveland Clinic, 46% of patients were referred for evaluation by internal medicine specialists or subspecialists, further supporting the potential role of vascular medicine specialists as providing access to vascular specialty care. [8] During the COVID-19 pandemic, access to vascular medicine care expanded to include telehealth services. [9]

- II. **The existence of a body of scientific medical knowledge underlying the subspecialty or subspecialty that is (i) clinically distinct from other areas in which accreditation is already offered, and (ii) sufficient for educating individuals in a clinical field, and not simply in one or more techniques.**

The body of scientific medical knowledge of the vascular medicine specialist has been well defined and encompasses broad clinical and didactic exposure across the spectrum of common peripheral vascular diseases, including: PAD, VTE, chronic venous disease, lymphedema, cerebrovascular disease, aortic disease, visceral vascular disease, and vasospastic disorders. [10] The subspecialty also encompasses knowledge of diagnosis and management of uncommon and rare peripheral vascular diseases, including fibromuscular dysplasia, vasculitis, genetic/congenital vascular conditions, and occupational vascular disorders, among others. In addition to specific disease entities, the body of knowledge of the vascular medicine specialists includes atherosclerotic risk reduction, anticoagulation management (including skills required to lead an anticoagulation management service), and evaluation of thrombophilia as well as wound care and edema management techniques (for venous and lymphatic disease).

An important procedural component of the body of knowledge of vascular medicine is non-invasive vascular testing and interpretation of duplex and physiological testing for arterial and venous disease throughout the body. Training in vascular medicine also includes exposure and development of skills necessary for developing future medical directors of non-invasive vascular laboratories, including principles of accreditation and quality improvement and hands-on scanning experience. Vascular medicine training includes extensive time in the non-invasive vascular laboratory, and a majority of vascular medicine trainees sit for the Registered Physician in Vascular Interpretation certification examination. [11]

An updated document of specifics of the core content and knowledge milestones for advanced training in vascular medicine has been recently published through a multi-societal collaboration that included the American College of Cardiology (ACC), SVM, American Heart Association (AHA), Society for Vascular Surgery (SVS), and American College of Physicians (ACP), among other organizations. [10] This document replaces prior documents outlining vascular medicine subspecialty training. [12] Table 1 presents the core competencies and specific milestones to be accomplished during training as a vascular medicine specialist. Table 2 presents common professional behavior competencies relevant to all clinical specialists.

Vascular medicine training components as part of Cardiovascular Medicine fellowship (COCATS 4) have been described; however, this training is inadequate to meet all milestones required of a vascular medicine specialist

and detailed in the advanced training document. [10, 11] For most general cardiovascular medicine fellows, training includes exposure of 1 month to vascular medicine during the three years of fellowship training (COCATS Level I). [11] The insufficient number of vascular medicine specialists in cardiovascular medicine programs may also limit the fellow's clinical exposure. Some general cardiovascular fellows may seek additional rotations during a general cardiology fellowship to gain additional exposure in vascular medicine, but this does not allow for acquisition of the training and experience required to become a vascular medicine specialist as outlined in the advanced training statement (COCATS Level III training) [10, 11] Indeed, according to the recent content blueprint, only 6% of the Cardiovascular Medicine Board examination covers topics related to peripheral vascular diseases. [13] Although many interventional cardiology fellowship programs include exposure to peripheral vascular disease (e.g., peripheral artery disease and venous thromboembolism), exposure beyond atherosclerotic arterial disease and the medical and diagnostic aspects of vascular medicine is limited. Current expansion of interventional cardiology training to include structural heart disease has further limited the time available for training in peripheral vascular disease.

Beyond cardiovascular medicine, few internal medicine residency training programs offer rotations in vascular medicine, and peripheral vascular disease-specific content on the ABIM internal medicine examination is limited. Dedicated training in the medical aspects of vascular disease management is limited. [14] Indeed, there are no currently accredited training programs for other subspecialties that are sufficient to provide the training necessary for competency as a vascular medicine specialist. [10] Vascular medicine trainees may enter a fellowship from an internal medicine residency or following completion of another medical subspecialty, or trainees may come to a vascular medicine fellowship following completion of a cardiovascular medicine fellowship. Vascular medicine fellowship training programs to date have consisted of either one or two years. As the body of knowledge continues to expand it is the expectation that those physicians with only internal medicine background would be best served by completing a two-year VM fellowship. Fellows who have completed a cardiovascular medicine or have extensive exposure to VM during other residency/fellowships who meet COCATS level I/II requirements can generally achieve Level III milestones, can complete vascular medicine specialty training in one year. [10, 11]

The unique body of scientific medical knowledge of vascular medicine has been recognized in the United States and abroad by the medical community. [15] In the US, vascular medicine has been recognized as a distinct subspecialty by the vascular surgical community, as evidenced by support of the SVS. For example, SVS sought out SVM to help build the VQI Vascular Medicine Consult Registry. Vascular medicine has been represented in broad initiatives sponsored by both the American Board of Internal Medicine and American College of Physicians and has participated in the development of current and past statements that have defined advanced training in vascular medicine. [16, 17] The National Heart, Lung, and Blood Institute has recognized the unique subspecialty of vascular medicine and previously funded seven academic training programs in vascular medicine through a multi-year K12 program.[18] More recently, the Anticoagulation Forum, a non-profit organization, has funded multiple clinical vascular medicine programs. [19] Outside of the United States, vascular medicine/angiology has also been broadly recognized as a distinct subspecialty, including accreditation of training centers and certification of vascular medicine specialists in Europe through the European Union of Medical Specialists (UEMS) Division of Angiology/Vascular Medicine. [20, 21]

**III. The existence of a sufficiently large group of physicians who concentrate their practice in the proposed specialty or sub-specialty**

The Society for Vascular Medicine (SVM) was founded in 1989 by 14 members. As of October 2020, there are 554 total members of SVM (12% increase from 2019). The breakdown of the membership includes 233 fellow members (“FSVM”, defined as active practicing, attending physicians who have been SVM members for at least one year and have a commitment to vascular medicine practice); 142 doctoral members (early career MD, DO, MBBS, PhD, PharmD, or equivalent); and 110 associate members (must be in a postgraduate training program and then can move to doctorate category prior to fellow category). In addition, there are 35 advanced practitioners, 9 vascular care team members (vascular technologists and others), and 25 senior members (retired physicians).

In 2019, the SVM developed a survey to better understand the practice of vascular medicine and the vascular medicine community. [22] The SVM prepared a database list that went back to 2016 including all current SVM members and members that may have “rolled off”. They included those in the doctorate or fellow category only. The SVM then obtained a database from the American Board of Vascular Medicine (ABVM) that included years 2014-2018 of potential/eligible ABVM diplomats including recertification candidates. They removed duplicates from each to create a final list to include in the survey. A total of 1058 physicians were invited to participate in the survey with ~24% participation rate. Table 3 presents selected demographic information from this survey. Most respondents note the lack of specialty recognition as a challenge for their practice. Many respondents also emphasized the need of increased specialty awareness for patients and providers, the need for more vascular medicine training programs, and the need for standardization of training programs.[22]

The SVM formed the ABVM, a non-profit corporation in 2005, to create a certification process for the field. The ABVM has subsequently merged with Inteleos that manages the Alliance for Physician certification & Advancement (APCA) to provide certification in general vascular and endovascular medicine. The general examination is for non-invasive VM specialists and the endovascular medicine examination are for physicians who actively provide peripheral interventional procedures. Some physicians therefore are qualified to take both examinations. The ABVM certifies physicians in the US and Canada. These specialty examinations qualify as high-stakes evaluations based upon psychometric parameters. The professional testing centers, board review courses, and significant number of specialty physicians seeking this certification attest to its importance. The general vascular medicine examination is for only those who practice vascular medicine who already attained primary certification through the American Board of Internal Medicine (ABIM) or the American Osteopathic Board of Internal Medicine. (AOBIM). Qualifications to sit for the general examination include: an active state medical license, successful American Board of Medical Specialties (ABMS) primary board recognition, and a letter of attestation regarding commitment to the practice of vascular medicine. Candidates apply either following formal fellowship training or through a practice pathway composed of those who have dedicated at least 50% of their practice to vascular medicine. The majority of candidates hold a primary certificate in internal medicine or cardiovascular medicine.



Although this certification is not recognized by the ABMS, it is recognized by the members of the vascular medicine community, some state medical boards, and hospital credentials committees. Each region of the United States has been significantly represented in the candidate pool. There have been 851 diplomates (certificate holders) of the general vascular medicine examination since the initial test given in 2005. The median pass rate is 78%, reflecting the unique knowledge and skills specific to the specialty of vascular medicine. [23]

Recertification of diplomats started in 2015, 10 years after initial ABVM certification. The ABVM has recertified 110 physicians in general vascular medicine.

**IV. The existence of national medical societies with a principal interest in the proposed subspecialty or sub-sub-specialty**

The specialty of vascular medicine is not new. Mayo Clinic developed the specialty in the 1940s. Mayo Clinic published a textbook considered by many as a classic, complete textbook on vascular disease in the 1950s. [24] It prospered for five editions. Subsequent growth came from the Cleveland Clinic and several institutions in Boston, Massachusetts. By 1989, a group of vascular medicine physicians formed the SVM and started their own journal, now named *Vascular Medicine*. The SVM has collaborated on many “position papers” and joint meetings for vascular educational purposes with the ACC, AHA, ACP, SVS, Society for Catheterization and Intervention (SCAI), American Venous Foundation (AVF), Society for Venous and Lymphatic Medicine (SVLM), Society for Cardiovascular Surgery (SCS), Society for Vascular and Interventional Radiology (SIR), among others. The SVM has served as a founding member of the Intersocietal Accreditation Commission (IAC), a multi-societal organization that accredits vascular diagnostic and treatment facilities, as well as diagnostic and therapeutic facilities in other areas of medicine. The SVM also is recognized internationally and has had joint meetings with the Royal Society of Angiology, the Swedish Society for Vascular Medicine, and more recently VAS, the European Independent Foundation in Angiology/Vascular Medicine. These organizations respect the importance of the SVM, the clinical expertise of its membership, and willingness of its members to get things done to advance our field. A stronger, more robust SVM complements each of these other societies rather than detracting or diminishing their own societal interests.

Recognition of vascular medicine as a unique and important practice came in 1997, when the American Medical Association allowed physicians to designate their practice specialty as “vascular medicine” to permit collection of distinct specialty characteristics in future membership surveys and demographic reviews of U.S. physicians.

The growth of SVM has been steady but limited by the number of fellowship training opportunities. A lack of funding is thought to be the main limitation. In 2005, it became apparent that there was an increasing need for physicians to serve in academic leadership roles as mentors for those seeking training in vascular medicine, the National Heart, Lung, and Blood Institute (NHLBI)-sponsored Research Career Development Programs in Vascular Medicine. Seven programs were supported by the NHLBI. Beginning in 2019, the Anticoagulation Forum/Ansell Fellowship Program provided grant funding to support advanced training for physicians dedicated

to the fields of VTE, vascular diseases, anticoagulation, and related areas. This fellowship in General Vascular Medicine is intended to “increase the number of expert clinicians equipped to provide evidence-based management to patients at risk for thrombosis, but also create a new generation of clinical investigators who will further improve upon current anticoagulation treatment paradigms.” [19] The need for these fellowships reflect upon the fact that “venous and thromboembolism are major causes of morbidity and mortality, and their incidence is anticipated to double by 2050. Antithrombotic therapies used to prevent or treat these thromboembolic events are dangerous and burdensome, if not managed properly. As the risk-benefit tradeoffs associated with anticoagulant medications become more complex, there is a need for more experts in this field.” [19] These grants are awarded annually, and the 2021-2022 recipient sites include: **Boston Medical Center, Beth Israel Deaconess Medical Center, Johns Hopkins, University Hospitals Cleveland, University of Michigan, and Vanderbilt University Medical Center.** Sites who received grants in 2020-2021 included: **The Mayo Clinic, Stanford University, University of North Carolina School of Medicine, University Hospitals Cleveland, University of Michigan, and Boston Medical Center.**

V. **The regular presence in academic units and health care organizations of educational programs, research activities, and clinical services such that the specialty or sub-specialty is broadly available nationally**

A survey of program directors who offered formal training in vascular medicine was done in 2009 and again in 2020. Table 4 lists these training programs. There are several observations that can be inferred from these lists.

- a. There are institutions who have consistently provided training without outside grants or funding.
- b. There are institutions that no longer train.
- c. Academic institutions predominate.
- d. Training is “fluid,” with intermittent participation.
- e. There is tremendous potential to grow vascular medicine training programs.

The ABVM reviewed the number and location of training sites for those physicians who took the endovascular examination between 2012-2017. There were 147 training centers identified. The geographic representation based upon US region of practice was: Eastern 26%; Midwest 26%; Southern 34%; and Western 14%, with representation in every state. These figures suggest there are a large diverse group of physicians who practice vascular medicine at experienced centers for graduate medical education, and these centers can potentially become training sites for vascular medicine physicians.

There are also unique research centers worth highlighting that have experience with basic science as well as training vascular medicine clinical specialists. These include Methodist Hospital in Houston (Dr. John Cooke), University of Colorado (Dr. Judith Regensteiner), Stanford University (Dr. Stanley Rockson, Dr. Nicholas Leeper), Cleveland Clinic (Dr. Scott Cameron), and University of Minnesota (Dr. Diane Treat-Jacobson).

VI. **The duration of the specialty or sub-specialty program is at least one year beyond education in the core specialty.**



The initial document with guidance for training in vascular medicine was published in 2003 [12]. The American College of Cardiology has published guidelines for training in vascular medicine for cardiovascular fellows [11]. This document describes three levels of training.

- Level 1: details basic training in vascular medicine that is incorporated into competency for cardiovascular consultation (i.e., risk factor modification).
- Level 2: describes additional training to level I that enables some cardiovascular specialists to render more specialized care (i.e., interpret peripheral vascular laboratory examinations).
- Level 3: describes additional training and experience beyond cardiovascular training to acquire specialized knowledge and competencies in performing, interpreting, and training others to render advanced care as a vascular medicine specialist.

A newer training document (advanced training document for vascular medicine), published in 2021, serves as a more detailed, comprehensive statement than COCATS 4 (published in 2015) in describing the knowledge and skills necessary for clinical competence as a vascular medicine specialist. [10] It was co-sponsored by ACC, AHA, ACP, and SVM. This document summarizes the knowledge and skills for all vascular medicine specialists, equivalent to Level 3 training (Table 1). These core competencies and curricular milestones are organized according to anatomic territory and are applicable to all vascular medicine trainees; those with prior cardiovascular training (CVT) and those with only internal medicine training prior to vascular medicine fellowship.

To fulfill these milestones, those fellows who have completed an ACGME-, AOA-, ACGME-I, or RCPSC-accredited program in internal medicine are eligible for vascular medicine F1 appointment. The program will consist of 24 months for F1 fellows. Fellows who have completed a two- or three- year ACGME-, AOA-, ACGME-I, Or RCPSC-accredited fellowship are eligible for vascular medicine F2 appointment. The program will consist of 12 months for F2 fellows.

Table 5 outlines the requirements for both pathways to achieve specialized training in vascular medicine. The specific basic standards are part of the *Common Basic Standards for Fellowship Training in Internal Medicine Subspecialties*, which govern and define training in all medical subspecialties. These requirements are in addition to all requirements in the *Common Basic Standards*. Each program should be encouraged to provide the knowledge and skills that are in compliance with the *Common and Subspecialty-specific Program Requirement*. It is within this framework that programs may place special emphasis on research, vascular laboratory study interpretation and management, wound care, etc., to meet the needs of the community it serves.

- VII. A projected number of programs sufficient to ensure that ACGME accreditation is an effective method for quality evaluation, including current and projected numbers for each participating specialty if the subspecialty is multidisciplinary.**

Table 6 lists 22 medical institutions that currently have formal vascular medicine training programs. These are highly acclaimed academic institutions. A specific vascular medicine training survey of potential vascular medicine program directors suggested that the number of programs would double in the short-term following ACGME program accreditation. [26] Several of these institutions also noted the challenge of too many qualified applicants for too few spots.

The actual number of trainees per site varies each year depending on local funding and candidate acceptability. In general, 18-23 fellows graduate each year from a formal vascular medicine training program.

***VIII. The educational program is primarily clinical.***

The general vascular medicine certification examination provided by ABVM provides the blueprint of knowledge and skills necessary for a vascular medicine specialist. The key content areas include: PAD (critical limb ischemia, acute limb ischemia, chronic arterial occlusive disease); cerebrovascular disease; visceral artery disease (renal and mesenteric disease); aortic disease; venous disease (acute and chronic VTE; visceral venous disease); thrombophilia and coagulopathy; non-invasive laboratory interpretation; and leg ulcers (venous, arterial, atypical). The examination content covers specific areas of diagnosis, management, and complications and are weighted accordingly (Table 7).

Much of the clinical content requires direct patient interaction through bedside teaching and experiences. Fellows are taught to actively direct patient care by using the “apprentice” model of training by staff who mentor trainees as they move from a “task-oriented” to a “patient-centered” focus. This requires good teachers, leadership and mentorship. In support of this, the SVM initiated a program to connect more seasoned VM specialists with early career VM specialists to foster mentoring within our specialty.[27]

In more general terms, the mission of the SVM is to promote and advance the discipline of vascular medicine and the care of patients with vascular disease by:

- Establishing standards for post-graduate training and stimulating the formation of vascular medicine training programs. (i.e.-develop training guidelines and consensus statements with collaboration with American College of Cardiology/American Heart Association/Society Interventional Radiology).
- Developing educational activities including continuing medical education programs for trainees and health care providers. (e.g., Society for Vascular Surgery/American Heart Association/Society for Vascular Medicine- Vascular Medicine Consult Registry
- Fostering research in vascular medicine and biology. (i.e.- young investigator awards
- Promoting interdisciplinary clinical excellence in the diagnosis and treatment of vascular disease through the creation of care standards and by engaging in quality improvement activities. (i.e.- national and international societal multidisciplinary collaboration).
- Serving an advisory role to educational institutions, government agencies, and other health care organizations. (e.g., multidisciplinary task force that lobbied MEDCAC for supervised exercise training approval and similar task force that has worked closely with FDA addressing the safety of drug-coated balloons and drug-eluting stents [28]

The SVM has conducted annual meetings since 1990. [29] The curricula are clinically based and include basic science updates. The program outline lists the clinical areas that were covered in the 2020 virtual meeting with no major deviations for the 2021 virtual meeting (Table 8). [30]

The SVM has maintained a high-quality, peer-reviewed journal since 1996. [31] The content of *Vascular Medicine* (<https://journals.sagepub.com/home/vmj>) includes original research articles, reviews, case reports, editorials, images, and vascular disease patient information pages. This clinically orientated journal solicits manuscripts in the following areas of interest: vascular biology and physiology; prevention and treatment of vascular disease; vascular imaging and diagnostic testing; medical treatments of vascular disease; endovascular intervention; vascular surgery; clinical thrombosis and thrombotic disorders; and additional topics of relevance to the clinical subspecialty of vascular medicine.

In summary, the field of vascular medicine provides enhanced, focused care for patients with vascular disease. The ever-expanding body of knowledge, evolution of novel vascular therapies, coupled with the clinical need makes growth of vascular medicine critically important. The society (SVM), the certification board (ABVM), the journal (*Vascular Medicine*), and the annual meetings are aligned in this mission.

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**Table 1. Competency Components and Curricular Milestones for Training Specialists in Vascular Medicine [10]**

Medical Knowledge	Milestones	
	All	Add*
1. Know the anatomy of the peripheral arterial, venous, and lymphatic systems.	X	
2. Know the basic vascular biology of atherosclerosis and thrombosis.	X	
3. Know the indications for and contraindications, benefits, risks, and clinical pharmacology, of drugs used to treat atherosclerotic vascular diseases.	X	
4. Know the indications for and contraindications, benefits, risks and clinical pharmacology of drugs used to prevent and treat arterial and venous thrombotic disorders.	X	
5. Know the appropriate indications and laboratory tests to assess for inherited and acquired thrombophilia.	X	
6. Know different strategies for smoking cessation.	X	
7. Know the pathophysiology, causes, and clinical epidemiology of upper and lower extremity ulcers.	X	
8. Know the principles of and indications for vascular duplex ultrasound including physics, blood flow, continuous and pulsed wave Doppler, color Doppler, and gray scale imaging.	X	
9. Know the principles of and indications for arterial and venous physiologic studies (e.g., segmental pressures, pulse volume recording, plethysmography).	X	
10. Know the role of advanced imaging (e.g., computed tomography, magnetic resonance imaging, and positron emission tomography) in the evaluation and management of patients with vascular diseases.	X	
11. Know the indications for, and contraindications, benefits, and risks of invasive angiography and venography.	X	
12. Know the indications for, and contraindications, benefits, and risks of endovascular and open vascular surgical procedures.	X	
13. Know the pathophysiology, clinical epidemiology, risk stratification, and management of vascular disorders associated with pregnancy and the postpartum period (e.g., venous thromboembolism, aortic aneurysm, aortic dissection, amniotic fluid embolism).	X	
14. Know the pathophysiology, clinical epidemiology, and management of vascular complications of cancer and cancer therapies.		X
<b>Peripheral Artery Disease</b>		
15. Know the pathophysiology, causes, and clinical epidemiology of lower and upper extremity peripheral artery disease (e.g., asymptomatic, intermittent claudication, functional impairment, critical limb ischemia, and acute limb ischemia), including risk factors and healthcare disparities.	X	
16. Know the pathophysiology, causes, and clinical epidemiology of nonatherosclerotic arterial diseases of the extremities including thromboembolic disease, atheroembolism, vasculitis, cystic adventitial disease, compression syndromes, endofibrosis, fibromuscular dysplasia, thromboangiitis obliterans, peripheral aneurysms and dissection.	X	



**Table 1. Continued**

	Milestones	
	All	Add *
<b>Medical Knowledge</b>		
17. Know the cardinal symptoms and physical findings of peripheral artery disease including atypical symptoms, claudication, critical limb ischemia, and acute limb ischemia.	X	
18. Know the indications and methods for diagnosis of patients with suspected peripheral artery disease.	X	
19. Know the medical therapies and lifestyle modifications to reduce cardiovascular risk in patients with peripheral artery disease.	X	
20. Know the medical therapies to reduce limb symptoms and adverse limb events in patients with peripheral artery disease.	X	
21. Know the components of and indications for supervised exercise therapy for claudication.	X	
22. Know the indications and methods for diagnosis of patients with symptomatic peripheral artery disease.	X	
23. Know the indications for endovascular and surgical revascularization for patients with peripheral artery disease.	X	
24. Know the indications and imaging methods for surveillance after endovascular and surgical revascularization in patients with peripheral artery disease.	X	
25. Know the cardinal symptoms, physical findings, and diagnostic approaches to peripheral vascular entrapment syndromes, including thoracic outlet syndrome and popliteal artery entrapment syndrome.	X	
<b>Renal and Mesenteric Artery Disease</b>		
26. Know the pathophysiology, causes, and clinical epidemiology of acute and chronic renal and mesenteric artery disease, including atherosclerotic and nonatherosclerotic diseases (e.g., fibromuscular dysplasia, nutcracker syndrome, median arcuate ligament syndrome), and visceral artery aneurysms and dissection.	X	
27. Know the cardinal symptoms and physical findings of acute and chronic renal and mesenteric arterial diseases.	X	
28. Know the pathophysiology of hypertension, kidney disease, and heart failure in patients with renal artery stenosis.	X	
29. Know the indications and methods for diagnosis of renal artery stenosis.	X	
30. Know the indications for invasive angiography, angioplasty and stenting, and surgical bypass in patients with renal artery stenosis.	X	
31. Know the indications and methods to diagnose mesenteric arterial and venous diseases.	X	
32. Know the indications for invasive angiography, angioplasty and stenting, and surgical bypass in patients with mesenteric artery stenosis.	X	
33. Know the management of visceral artery aneurysms, including identification of patients for whom surgical or endovascular repair is indicated.	X	
34. Know the methods for evaluation after a patient has undergone renal or mesenteric arterial revascularization.	X	

**Table 1. Continued**

	Milestones	
	All	Add *
<b>Medical Knowledge</b>		
<b>Cerebrovascular Disease</b>		
35. Know the pathophysiology, causes, and clinical epidemiology of cerebrovascular disease, including atherosclerotic and nonatherosclerotic diseases (e.g., fibromuscular dysplasia, dissection, aneurysm, carotid body tumor).	X	
36. Know the cardinal symptoms and physical findings of cerebrovascular diseases.	X	
37. Know the methods for diagnosis of asymptomatic and symptomatic carotid artery stenosis.	X	
38. Know the diagnosis and management strategies for patients with subclavian steal.	X	
39. Know the risk stratification strategies, lifestyle modifications, and medical therapies to reduce risk of stroke in patients with cerebrovascular disease.	X	
40. Know the indications for endovascular and surgical revascularization for subclavian, vertebral, and carotid artery stenosis.	X	
41. Know the anticoagulation strategies for stroke prevention in patients with atrial fibrillation and other causes of cardioembolism.	X	
42. Know the periprocedural management strategies for patients who undergo carotid revascularization.	X	
43. Know the indications and imaging methods for surveillance and evaluation of patients after carotid revascularization.	X	
<b>Aortic Diseases</b>		
44. Know the pathophysiology, causes, and clinical epidemiology of aortic diseases, including acute aortic syndromes, atherosclerotic aortic disease, and aortic aneurysms.	X	
45. Know the cardinal symptoms and physical findings of thoracic and abdominal aortic aneurysms and acute aortic syndromes, including dissection and intramural hematoma.	X	
46. Know the methods for initial evaluation and management of patients with acute aortic syndromes, including indications for emergent surgical or endovascular repair.	X	
47. Know the methods for surveillance, evaluation, and management of patients with prior acute aortic syndromes, including indications for surgical or endovascular repair.	X	
48. Know the indications for screening for thoracic, abdominal, and peripheral arterial aneurysms.	X	
49. Know the indications, benefits, and risks of and expected outcomes for surgical and endovascular treatments for acute aortic syndromes.	X	
50. Know the indications, benefits, and risks of and expected outcomes for surgical endovascular treatments for aortic aneurysm and peripheral aneurysms.	X	
51. Know the indications and imaging methods for surveillance, evaluation, and management of patients who have undergone thoracic or abdominal aortic endovascular repair.	X	

**Table 1. Continued**

Medical Knowledge	Milestones	
	All	Add *
<b>Vasculitis, Vasospastic, and Temperature-Related Disorders</b>		
52. Know the pathophysiology, causes, and clinical epidemiology of large, medium, and small vessel vasculitides.	X	
53. Know the cardinal symptoms and physical findings of large, medium, and small vessel vasculitides.	X	
54. Know the differential diagnosis and evaluation of vasculitis.	X	
55. Know the principles of medical management of vasculitis.	X	
56. Know the indications for and, contraindications, risks, and clinical pharmacology of drugs used to treat vasculitides.		X
57. Know the indications for referring patients with vasculitis for invasive angiography and revascularization procedures.	X	
58. Know the evaluation and management of patients with thromboangiitis obliterans.	X	
59. Know the pathophysiology, causes, and clinical epidemiology of vasospastic disorders such as Raynaud phenomenon and other temperature-related disorders of blood vessels including acrocyanosis, erythromelalgia, and pernio.	X	
60. Know the cardinal symptoms and physical findings of vasospastic disorders such as Raynaud phenomenon and other temperature-related disorders of blood vessels including acrocyanosis, erythromelalgia, and pernio.	X	
61. Know the evaluation, diagnostic approach, and medical therapies for Raynaud phenomenon, acrocyanosis, erythromelalgia, and pernio.	X	
62. Know the indications for and, contraindications, benefits, risks, and clinical pharmacology of drugs used to treat vasospastic disorders, such as Raynaud phenomenon.	X	
<b>Acute and Chronic Venous Diseases</b>		
63. Know the pathophysiology, causes, and clinical epidemiology of deep venous thrombosis and pulmonary embolism.	X	
64. Know the pathophysiology, causes, and clinical epidemiology of superficial vein thrombosis.	X	
65. Know the pathophysiology, causes, and clinical epidemiology of chronic venous insufficiency and varicose veins.	X	
66. Know the cardinal symptoms and physical findings of deep venous thrombosis and pulmonary embolism.	X	
67. Know the cardinal symptoms and physical findings of chronic venous insufficiency and varicose veins.	X	
68. Know the cardinal symptoms and physical findings of less common venous thrombosis, including cerebral sinus vein thrombosis, splanchnic vein thrombosis, and mesenteric vein thrombosis.	X	
69. Know the methods for risk assessment and diagnosis of deep venous thrombosis and pulmonary embolism.	X	
70. Know the methods for diagnosis of chronic venous insufficiency and varicose veins.	X	
71. Know the methods for diagnosing less common venous thrombosis, including cerebral sinus	X	

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vein thrombosis, splanchnic vein thrombosis, and mesenteric vein thrombosis.		
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**Table 1. Continued**

Medical Knowledge	Milestones	
	All	Add *
72. Know the indications for and contraindications, benefits, risks, and clinical pharmacology of drugs to prevent and treat deep venous thrombosis and pulmonary embolism.	X	
73. Know the indications, contraindications, benefits, and risks, of thrombolytic therapy for deep venous thrombosis and pulmonary embolism.	X	
74. Know the indications for referring patients with venous thrombosis and pulmonary embolism for advanced therapies (e.g., catheter directed thrombolysis/thrombectomy, surgical thrombectomy/embolectomy).	X	
75. Know the evaluation and management of patients with chronic thromboembolic pulmonary hypertension.	X	
76. Know the evaluation and management of patients with venous compression syndromes including May-Thurner, thoracic outlet, nutcracker and pelvic congestion syndromes.	X	
77. Know the management of patients with varicose veins, venous insufficiency and venous ulcers.	X	
78. Know the indications for referring patients with chronic venous insufficiency for interventional therapies.	X	
<b>Lymphatic Diseases and Lipedema</b>		
79. Know the pathophysiology, causes, and clinical epidemiology of lymphedema.	X	
80. Know the cardinal symptoms and physical findings of lymphedema.	X	
81. Know the differential diagnosis and evaluation of lower and upper extremity swelling (e.g., venous insufficiency, lipedema, congestive heart failure.)	X	
82. Know the indications to refer patients for comprehensive decongestive therapy including manual lymphatic drainage, compression therapy, and surgical approaches for lymphedema.	X	
83. Know the pathophysiology, causes, and clinical epidemiology of lipedema.	X	
84. Know the cardinal symptoms and physical finding of lipedema.	X	
85. Know the medical treatments and indications to refer patients for surgical approaches for treating lipedema.		X
<b>Evaluation Tools:</b> chart-stimulated recall, direct observation, and in-training exam		
Patient Care and Procedural Skills	Milestones	
	All	Add *
1. Skill to conduct a vascular history.	X	
2. Skill to perform physical examinations including maneuvers for the evaluation of arterial, venous, and lymphatic diseases.	X	
3. Skill to perform and interpret ankle-brachial index (ABI) assessment using a hand-held Doppler device.	X	
4. Skill to treat venous insufficiency using compressive therapies.	X	
5. Skill to manage non-healing wounds, including debridement techniques, dressing selection, and selection of adjunctive wound healing therapies,		X
6. Skill to perform preprocedural risk assessment for patients undergoing endovascular and open vascular surgical procedures.	X	
7. Skill to manage lymphedema with compression therapy.	X	

8. Skill to perform manual lymphatic therapy.		X
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**Table 1. Continued**

Patient Care and Procedural Skills	Milestones	
	All	Add*
9. Skills to evaluate and manage lower extremity ulcers, including indications for adjunctive imaging and biopsy, indications and techniques for debridement, and selection of dressings.	X	
10. Skills to implement and oversee a supervised exercise program for patients with peripheral artery disease.	X	
11. Skill to evaluate vascular anatomy from imaging modalities (e.g., ultrasound, computed tomographic angiography, magnetic resonance angiography).	X	
12. Skill to treat femoral pseudoaneurysm with ultrasound-guided compression therapy or ultrasound-guided thrombin injection.		X
13. Skill to perform sclerotherapy, venous ablation, and phlebectomy to treat patients with superficial venous disease.		X
<b>Noninvasive Diagnostic Tests</b>		
14. Skills to acquire and interpret duplex ultrasound of carotid, renal, mesenteric, aortic, and extremity arteries including stents and aortic endografts.	X	
15. Skills to acquire and interpret duplex ultrasound of upper and lower extremity veins.	X	
16. Skills to acquire and interpret noninvasive arterial physiologic studies of the extremities at rest and with exercise.	X	
17. Skills to acquire and interpret duplex ultrasound and physiologic studies prior to and for vascular access for dialysis.	X	
18. Skills to perform maneuvers in the vascular laboratory for assessment of arterial and venous diseases and interpret the results.	X	
19. Skills to acquire and interpret duplex ultrasound for evaluating post-procedural vascular complications including arteriovenous fistula, pseudoaneurysm, dissection, and hematoma.	X	
20. Skills to acquire and interpret vascular imaging for detection of subclinical arterial disease including carotid-intima medial thickness, flow-mediated dilation, and arterial stiffness.		X
21. Skills to perform and interpret transcranial Doppler testing		X
<b>Evaluation Tools:</b> chart-stimulated review, direct observation, and multisource evaluation		

\*Add indicates additional competencies that extend beyond core expectations that may be achieved by some Level III-trained vascular medicine specialists based on career focus, either during or following formal fellowship training (see [10] for details).

**Table 2. Common Professional Behavior Competencies Relevant to All Clinical Cardiovascular Disease Specialists**

<b>SYSTEMS-BASED PRACTICE</b>	<b>All Specialists</b>
1. Incorporate risk-benefit analysis, cost, resource, and value considerations into care of patients with cardiovascular disease.	X
2. Identify and address financial, cultural, and social barriers to adherence with patient care recommendations, including social determinants of health.	X
3. Participate in practice-based continuous quality improvement and safety initiatives.	X
4. Maintain continuity of care with efficient and effective handoffs through transitions of care.	X
5. Refer patients for new therapies, including consideration of participation in clinical trials.	X
6. Participate in hospital-based and regional systems of care for patients with urgent and emergent cardiovascular conditions.	X
7. Collaborate with all cardiovascular care team members to reduce avoidable hospitalizations for cardiovascular disease.	X
8. Collaborate with physicians and healthcare professionals in other disciplines to optimize the care of patients with complex and multisystem disease.	X
<b>Evaluation Tools:</b> chart-stimulated recall, direct observation, multisource evaluation	
<b>PRACTICE-BASED LEARNING AND IMPROVEMENT</b>	
1. Identify personal knowledge gaps and seek educational and training opportunities to improve knowledge, skills, and performance.	X
2. Utilize clinical practice guidelines, appropriate use criteria, and other information tools at the point of care to improve clinical decision-making.	X
3. Skill to conduct literature searches, abstract and interpret data, and apply results to clinical care.	X
4. Solicit and incorporate feedback from patients, colleagues, and other healthcare team members to improve clinical performance.	X
5. Use hospital and registry data to assess appropriateness, quality, and safety of cardiovascular care.	X
6. Develop the practice of lifelong learning, including regular review of journals and practice guidelines/AUC/consensus statements, and attending scientific and CME meetings.	X
<b>Evaluation Tools:</b> conference presentation, direct observation, global evaluation, reflection and self- assessment	

**Table 2. Continued**

<b>PROFESSIONALISM</b>	
1. Demonstrate respect, consideration, and empathy for patients, families, and all members of the healthcare team.	X
2. Understand the potential role of subconscious biases in clinical decision-making and interpersonal relationships.	X
3. Practice within the scope of personal expertise, training, and technical skills.	X
4. Seek and integrate advice from consultants in a timely manner.	X
5. Know current evidence-based clinical practice guidelines, consensus statements, appropriate use criteria, and performance measures relevant to scope of practice.	X
6. Identify, disclose, and manage relationships with industry and other entities to minimize bias and undue influence on clinical decision-making.	X
7. Demonstrate high ethical standards in personal and professional conduct.	X
8. Take responsibility and follow through on professional commitments and obligations in a timely fashion.	X
9. Identify potential for impaired professional performance in oneself and colleagues and take action to mitigate.	X
10. Attend to one's own health, well-being, and abilities in order to maximize personal and professional performance.	X
<b>Evaluation Tools:</b> conference presentation, direct observation, multisource evaluation, reflection and self-assessment	
<b>INTERPERSONAL AND COMMUNICATION SKILLS</b>	
1. Communicate with patients and families in an effective, timely, and culturally competent manner.	X
2. Engage patients in shared decision-making based upon balanced presentation of potential risks, benefits, and alternatives, factoring in patients' values and preferences.	X
3. Review medical records, complete documentation, and communicate results of diagnostic findings and management strategies to patients and collaborating healthcare professionals in a timely manner.	X
4. Lead and collaborate in interdisciplinary and cardiovascular care teams, treating all team members with respect.	X
5. Compassionately discuss sensitive/difficult topics, including end-of-life care and care of critically ill patients.	X
6. Provide emotional support to patients and families.	X
<b>Evaluation Tools:</b> direct observation, multisource evaluation	

**Table 3. Survey Results from 2019 Generated from the Society for Vascular Medicine [22]**

<b>Training Background</b>	<b>Practice Environment</b>	<b>ABVM Certification</b>	<b>Professional Activities</b>	<b>Clinical Activities</b>	<b>SVM Members</b>
<ul style="list-style-type: none"> <li>● Cardiovascular Medicine (53%)</li> <li>● Interventional cardiology (34%)</li> <li>● Internal medicine (includes IM only, IM + cardiovascular medicine) (72%)</li> <li>● Other (30%)</li> </ul>	<ul style="list-style-type: none"> <li>● Academic medical center (31%)</li> <li>● Private practice (24%)</li> <li>● Hospital-based practice (11%)</li> </ul>	<ul style="list-style-type: none"> <li>● ABVM certified (77%)</li> <li>● General only (56%)</li> <li>● Endovascular only (20%)</li> <li>● Both (24%)</li> </ul>	<ul style="list-style-type: none"> <li>● Patient care (77%)</li> <li>● Administrative (11%)</li> <li>● Research (8%)</li> <li>● Other (4%)</li> </ul>	<ul style="list-style-type: none"> <li>● Outpatient services (94%)</li> <li>● Inpatient consultative services (76%)</li> <li>● Endovascular arterial procedures (46%)</li> <li>● Endovascular venous procedures (35%)</li> <li>● Varicose vein procedures (36%)</li> <li>● Wound care (29%)</li> </ul>	<ul style="list-style-type: none"> <li>● SVM members (82%)</li> <li>● Formal Vascular medicine training (55%)</li> </ul>

ABVM = American Board of Vascular Medicine; SVM = Society for Vascular Medicine; IM = internal medicine

**Table 4. Formal Vascular Medicine Training Programs Sites According to Year Surveyed by the Society for Vascular Medicine [25]**

<b>Program Sites Listed in 2009</b>	<b>Program Sites Listed in 2020</b>
Arizona Heart Institute	Boston Medical Center
Aurora Cardiovascular Service	Brigham and Women's Hospital
Boston Medical Center	Brown University
Brigham and Women's Hospital	Case Western Reserve/University Hospitals
Case Western Reserve/University Hospitals	Cleveland Clinic
Central Cardiology Medical Center	Emory University
Cleveland Clinic	Hofstra University
Freemont Heart Surgery Clinic	Jobst Vascular Institute
Mayo Clinic	Johns Hopkins University
McLaren Hospital	Lahey Clinic
Mount Sinai Medical Center	Massachusetts General Hospital
Newark Beth Israel Medical Center	Mayo Clinic
Newark Beth Israel Medical Center	Mount Sinai Medical Center
North Central Heart Institute	Northwestern University
Northwestern University	Ochsner Clinic
Ochsner Clinic	Stanford University
Ohio State University	Thomas Jefferson University
Salam Heart Clinic	University of Michigan
Scott and White Hospital	University of North Carolina
St. Luke's Medical Center	University of Southern California
Stanford University	University of Virginia
The Methodist Hospital	Vanderbilt University
The Methodist Hospital	
University of Maryland	
University of Miami	
University of Minnesota	
University of Oklahoma	
University of South Carolina/Greenville	
University of Wisconsin	
VA Boston	
Wake Forest University	
Winthrop University	

**Table 5. Outline of Pathway Requirements for Training of Vascular Medicine Specialists**

Standard	Graduate of ACGME-Approved Internal Medicine Residency (F1 appointee)	Graduate of ACGME-Approved Internal Medicine AND Cardiovascular Fellowship (F2 appointee)
<b>Institutional requirements</b>	<ul style="list-style-type: none"> <li>● Facilities to care for patients with PVD, Vascular Surgery program, ICU, NIVL, PI, medical library, CT/MRI, Longitudinal care clinic</li> </ul>	Same
<b>Program Director (PD) and Faculty Requirements</b>	<ul style="list-style-type: none"> <li>● PD must review and approve the fellows' procedure logs every 6 months.</li> <li>● Review of fellows' performance (completed by attending of each rotation) on each monthly rotation will be also performed every 6 months.</li> <li>● Provide structure for fellowship including written curriculum material, a schedule of rotations, rounds, and conferences that meet the requirements set forth above.</li> <li>● Select faculty responsible for mentoring and teaching various aspects of vascular medicine to fellows and serving as role models.</li> <li>● Provide atmosphere conducive to scholarly activity and high-quality patient care.</li> <li>● Mentorship and constructive evaluation of faculty based upon comments from fellows, adherence to curriculum, and personal interaction.</li> <li>● Solicit and review applicants for admission to the program.</li> </ul>	Same
<b>Fellow Requirements</b>	<ul style="list-style-type: none"> <li>● Fellow must maintain procedure logs for all procedures.</li> <li>● Maintain professional conduct, appearance, and integrity to maximize their education through quality patient care.</li> <li>● Communicate to the program director any concerns or improvements that would advance the educational experience and/or patient care.</li> </ul>	Same



**Table 5. Continued**

<b>PROGRAM REQUIREMENTS AND CONTENT</b>		
<b>Duration</b>	<b>24 months</b>	<b>12 months</b>
<b>Medical knowledge</b>	<ul style="list-style-type: none"> <li>Must contain as a minimum basic science: physiology, anatomy, histology, pharmacology, epidemiology</li> </ul>	Same
<b>Regular conferences</b>	<ul style="list-style-type: none"> <li>Daily supervised clinical rounds with a member of the vascular medicine faculty for consultation and inpatient hospital patient care, documented in the medical record.</li> <li>Clinicopathological grand rounds in vascular medicine conducted at least once monthly at an hour when both trainees and faculty can attend. Case material should be selected for discussion based upon a core curriculum related to vascular diseases.</li> <li>Conferences at least twice a month devoted to the review and discussion of vascular imaging procedures including ultrasound, scintigraphy, CT, MR with emphasis upon clinical diagnosis, and patient management.</li> <li>Monthly conference on a critical review of literature emphasizing judicious trial methodology and application of statistical methods.</li> <li>Monthly quality assurance or morbidity and mortality review conference, ideally multidisciplinary, in which vascular surgeons, radiologists, cardiologists, and vascular medicine physicians participate.</li> </ul>	Same
<b>Patient care</b>	See Table 1 & 2	See Tables 1 & 2
<b>Ambulatory clinic</b>	<ul style="list-style-type: none"> <li>Ambulatory experience must take place a minimum of two half days per week for 36 weeks for 24 months: equivalent to 6900 hours</li> </ul>	<ul style="list-style-type: none"> <li>Ambulatory experience must take place a minimum of two half days per week for 36 weeks for 12 months: equivalent to 3450 hours</li> </ul>

**Table 5. Continued**

<b>Rotational curriculum</b>	<ul style="list-style-type: none"> <li>● Hospital consultative vascular medicine: 3–6 months</li> <li>● Vascular diagnostic laboratory and imaging: 3–6 months</li> <li>● Peripheral angiography and catheter-based endovascular intervention: 2–4 months</li> <li>● Vascular Surgery: 1 month</li> <li>● Elective rotations in vascular pathology, thrombosis, dermatology, rheumatology, research or advanced imaging: 6–8 months</li> </ul>	<ul style="list-style-type: none"> <li>● Hospital consultative vascular medicine: 3 months</li> <li>● Vascular diagnostic laboratory and imaging: 1–3 months</li> <li>● Peripheral angiography and catheter-based endovascular intervention: 1 month</li> <li>● Vascular surgery: 1 month</li> <li>● Elective rotations in vascular pathology, thrombosis, dermatology, rheumatology, research, or advanced imaging: 3 months</li> </ul>
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PVD = peripheral vascular disease; PI = peripheral intervention; NIVL = non-invasive vascular laboratory

**Table 6. Institutions in the United States and Canada that have Vascular Medicine Training Programs**

<b>Institution</b>	<b>No. of Fellows Trained (2010-2020)</b>	<b>No. of Current Fellows (2021)</b>
Boston Medical Center	7	1
Brigham and Women's Hospital	10	1
Brown University	9	1
Cleveland Clinic	37	4
Emory University	0	0
Hofstra University	2	1
Jobst Vascular Institute	1	0
Johns Hopkins University	0	1
Lahey Medical Center	1	1
Massachusetts General Hospital	8	1
Mayo Clinic	14	1
Mount Sinai University	10	1
Northwell Health	2	1
Northwestern University	6	2
Ochsner Clinic	6	1
Stanford University	3	1
Thomas Jefferson University	0	0
University Hospitals of Cleveland, Case Western Reserve University	0	1
University of Michigan	2	1
University of North Carolina	0	1
University of Southern California	0	1
University of Virginia	7	1
Vanderbilt University	0	1

**Table 7. Specific Topics on General ABVM Certification Test**

<b>Specific Topics</b>	<b>Weight</b>
Natural history, epidemiology, and pathophysiology	12%
Presentation and diagnosis: history, examination, testing, and differential	18%
Treatment: medical, interventional, surgical	17%
Prognosis, outcomes, and surveillance	13%
Vascular biology, risk factors, and prevention	7%
Miscellaneous topics: lymphedema, vasculitis, congenital, etc.	10%
Peri-procedural and surgical management	7%
Vascular laboratory	16%

ABVM = American Board of Vascular Medicine.

**Table 8. Annual Society for Vascular Medicine Scientific Sessions Program Outline (September 2020)**

Category	Content
<b>The Year in Vascular Medicine (Literature Review)</b>	<ul style="list-style-type: none"> <li>● Basic and translational science</li> <li>● Anticoagulants and antiplatelets</li> <li>● Non-atherosclerotic arterial disease</li> <li>● Arterial intervention</li> <li>● Venous/thrombosis intervention</li> <li>● Lymphatic disease</li> </ul>
<b>Specific 10-minute Lectures</b>	<ul style="list-style-type: none"> <li>● JMJD3 regulates macrophage-mediated inflammation in AAA</li> <li>● Anticoagulant use after peripheral endovascular intervention in intermittent claudicants is associated with increased risk of major adverse limb events</li> <li>● A deprived neighborhood environment and diminished health status gains following peripheral artery disease treatment: Insights from the PORTRAIT registry</li> <li>● Characterizing cancellations, exercise duration, and results of exercise ankle-brachial index testing</li> </ul>
<b>Case Presentations and Discussion</b>	<ul style="list-style-type: none"> <li>● Young female with a rare disease and palpable mass in the left cervical region</li> <li>● Severe aortic and mitral valve regurgitation in a patient with recurrent VTE</li> <li>● Heart failure symptoms and palpable abdominal mass in a 24-year-old female</li> <li>● An unusual case of extensive venous disease</li> <li>● Recurrent acute limb ischemia in a 65-year-old female</li> </ul>
<b>Vascular Implications of COVID-19</b>	<ul style="list-style-type: none"> <li>● COVID-19 vascular registry data: What have we learned and what's yet to come?</li> <li>● What have we learned from the COVID-19 autopsy data?</li> <li>● Immune activation and endothelial dysfunction in COVID-19</li> <li>● Anticoagulants for thrombosis prevention and treatment in COVID-19: Trials and tribulations</li> <li>● Managing thrombotic risk in hospitalized COVID-19 patients</li> </ul>

AAA = abdominal aortic aneurysm; VTE = venous thromboembolism; COVID-19 = coronavirus disease 2019