

Vascular Surgery Fellowship Curriculum
Goals and Objectives

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**VASCULAR SURGERY FELLOWSHIP
CURRICULUM
GOALS AND OBJECTIVES**

EDUCATIONAL GOALS AND PHILOSOPHY

The goal of the Vascular Fellowship Program at the West Virginia University is to provide training to general surgeons who, upon completion of the program, will be qualified vascular surgery specialists. This is accomplished by providing both the experiences and environment where fellows can develop the surgical skills, medical knowledge, communication, clinical skills, and professional attitudes to become physicians committed to lifelong learning, medical system integration, and excellence in the diagnosis of vascular diseases, performance of open vascular surgery, and endovascular interventions.

Whether fellows pursue an academic career or one in community practice, the goal of the Vascular Fellowship Program is to equip fellows with the ability to critically assess the medical literature, develop an understanding of research, and keep abreast of new developments. Since the acquisition of knowledge in medicine must be lifelong, general principles are emphasized, as well as the importance of independent study, so that fellows can continue their education well beyond the period of fellowship training. Certain attributes of character are inherent in the practice of medicine, as a result the importance of professionalism, communication, compassion, reliability, initiative, responsibility and the ability to work harmoniously with all levels of medical personnel is emphasized throughout the duration of training.

PROGRAM OVERVIEW

Goals: The general goals of the program are to provide a learning and training environment which facilitates the development of expert vascular surgery specialists who will have the tools and abilities to be leaders in both the clinical and academic community of vascular surgeons. These goals are accomplished by providing:

- Didactic instruction and research experience in vascular physiology and pathobiology.
- Instruction and direct clinical experience with the technology, clinical applications, and professional interpretation of noninvasive vascular testing.
- Instruction and direct clinical experience in the performance and interpretation of the complete spectrum of endovascular interventions.
- Supervised performance of open vascular surgical procedures.

Following successful completion of the training program the trainee should be eligible for certification as an RVPI (Registered Physician in Vascular Interpretation) and eligible for certification in Vascular Surgery by the American Board of Surgery. It is expected that the trainee will be a competitive candidate for the professional position of his or her choice, whether private practice, academic, or a combination of the two. Additionally, it is a goal of the program to graduate physicians competent in all aspects of vascular care, including diagnosis, medical management, endovascular and open management.

CURRICULUM OVERVIEW

The fellowship training program in Vascular Surgery at West Virginia University is a two-year program comprised of a balance of all the clinical and academic components of:

- Endovascular diagnostics and therapeutics
- Noninvasive vascular testing with ultrasound-based therapeutics
- Clinical research
- Open surgical procedures

These activities are all conducted at Ruby Memorial Hospital of West Virginia University

GOALS AND OBJECTIVES FOR COMPETENCIES

At the completion of the training program it is expected that the fellow will be fully prepared to embark on a career as a vascular surgeon through education and successful completion in the following areas:

Medical Knowledge: Fellows must demonstrate knowledge of established and evolving biomedical, clinical, epidemiological and social behavioral sciences, as well as the application of this knowledge to patient care:

- Demonstrate appropriate general medical knowledge in vascular diseases.
- Know and apply the basic and clinically supportive sciences which are appropriate to the discipline of vascular surgery.
- Demonstrate competence in all surgical and technical procedures commonly performed in vascular surgery.

Patient Care: Fellows must be able to provide both inpatient and outpatient care that is compassionate, appropriate and effective for the treatment of vascular diseases and the promotion of health. Fellows are expected to:

- Establish skills in gathering accurate and essential patient data.
- Demonstrate an understanding of informed treatment plans, including up to date Scientific evidence and clinical judgment.
- Demonstrate competence in pre and post-operative care, the ability to select the procedure most appropriate to the clinical situation, and to recognize his/her limitations.
- Demonstrate competence in all surgical and technical procedures commonly performed in vascular surgery.
- Demonstrate caring and respectful behaviors when interacting with patients and families.

Interpersonal and Communication Skills: Fellows must demonstrate interpersonal and communication skills that result in effective exchange of information and collaboration with patients, their families, and health professionals. Fellows are expected to:

- Communicate openly and effectively with patients, peers, healthcare professionals and ancillary staff.
- Utilize effective listening and questioning skills while providing and receiving patient

Information.

- Demonstrate effective exchange of information.
- Present clear and concise thoughts at conference and presentations.

Professionalism: Fellows must demonstrate commitment to carrying out professional responsibilities, and an adherence to ethical principles. Fellows are expected to:

- Demonstrate acceptance of their accountability to patients, society, their profession, and a commitment to professional development.
- Express a commitment to ethical principles pertaining to provision or withholding of clinical care, the confidentiality of patient information, informed consent, and business practices.
- Articulate sensitivity and responsiveness to patient's culture, age, gender and disabilities.

Practice Based Learning and Improvement: Fellows must demonstrate the ability to investigate and evaluate their care of patients, to appraise and assimilate scientific evidence, and to continuously improve patient care based on constant self-evaluation and life-long learning. Fellows are expected to:

- Demonstrate an ability to effectively utilize systematic methodology to assess practice experience and perform practice based improvement activities.
- Locate, appraise, and assimilate evidence from scientific studies related to patient's vascular problems.
- Demonstrate an ability to obtain and utilize information from patient population and the larger population from which they are drawn to enhance patient care.
- Utilize information technology to manage information, access on-line medical information, and to support their own education.
- Demonstrate an ability to utilize knowledge of study designs and statistical methods to recognize strengths and weaknesses in clinical studies and other information on diagnostic and therapeutic effectiveness.
- Facilitate the education of medical students, residents, and other healthcare professionals.

Systems Based Practice: Fellows must demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care. Fellows are expected to:

- Demonstrate understanding of vascular issues; how they affect other health care providers, the health care organization, and society as a whole. Collaborate with healthcare professionals from other disciplines to provide optimal care.
- Exhibit an understanding of how environmental factors impact healthcare organizations and healthcare costs.

- Demonstrate ability to recognize how types of medical practices and delivery systems differ from one another, including methods of controlling health care costs and allocating resources. Utilize this knowledge to insure quality healthcare.
- Develop an appreciation for practicing cost effective healthcare and resource allocation that does not compromise patient care.
- Express knowledge of hospital and community resources in place to support patients, advocate for quality patient care and consistently assist patients in dealing with complexities of the healthcare system.

Technical Skills: Fellows are expected to demonstrate competence in all surgical and technical procedures commonly associated with vascular surgery. In particular, competence must be acquired in:

- detailed vascular anatomy and physiology.
- proper history taking and physical examination of the patients with vascular problems in both the hospital and outpatient clinic setting.
- early recognition and treatment of complications of vascular surgery.
- open major vascular procedures.
- endovascular procedures.

FIRST YEAR OF TRAINING – PGY-VI

YEAR 1	Primary Activity	Secondary Activity
July	Vascular Service A-Endovascular rotation Clinical and Noninvasive Lab	-Research -Radiation Safety Course -Vascular Laboratory Interpretation
August	Vascular Service A-Endovascular rotation Clinical and Noninvasive Lab	-Research -Vascular Laboratory Interpretation / Computerized Tutorials
September	Vascular Service A-Endovascular rotation Clinical and Noninvasive Lab	-Research Vascular Laboratory Interpretation -Endovascular Studies Reading Basic
October	Vascular Service A-Open rotation Clinical and Noninvasive Lab	-Research Vascular Laboratory Interpretation

November	Vascular Service A-Open rotation Clinical and Noninvasive Lab	-Research Vascular Laboratory Interpretation
December	Vascular Service A-Open rotation Clinical and Noninvasive Lab	-Research Vascular Laboratory Interpretation
January	Vascular Service A-Endovascular rotation Clinical and Noninvasive Lab	-Research
February	Vascular Service A-Endovascular rotation Clinical and Noninvasive Lab	-Research
March	Vascular Service A-Endovascular rotation Clinical and Noninvasive Lab	-Research
April	Vascular Service A-Open rotation Clinical and Noninvasive Lab	-Research
May	Vascular Service A-Open rotation Clinical and Noninvasive Lab	-Research
June	Vascular Service A-Open rotation Clinical and Noninvasive Lab	-Research

GENERAL INFORMATION

Research

Fellows will be expected to become actively involved in research in vascular surgery, with the goal of completing at least one project suitable for presentation and publication. This may be a new project, which reflects a particular interest of the fellow, although generally the fellow engages in a project that reflects ongoing interests of the vascular faculty.

In addition to research activities, the fellow will become familiar with non-invasive vascular diagnosis. This will take the form both of directed reading in the basic science and physical principles on non-invasive vascular testing, as well as a hands-on experience. This experience is distributed among all the major types of vascular diagnosis, including carotid duplex scanning, venous duplex scanning, arterial testing and abdominal vascular examination. Attendance and participation in the monthly vascular lab teaching conferences is also expected. While not required, it is recommended that the fellow be prepared to take the vascular lab interpretation examination at the end of the fellowship.

Didactic Experiences

The fellow is responsible for choosing case presentations and topics for the weekly main Vascular Conference, and coordinating preparations and topics of educational materials for discussion. Topics will be reviewed with the Program Director at the beginning of each year. The fellow is also responsible for presenting at the Vascular Mortality and Morbidity conference and attending the joint conference

with the general surgery residents. Fellows are expected to attend and present at the plenary session of the yearly Regional Heart and Vascular Update Symposium.

Clinical Rotations

The goal of the clinical experience in vascular surgery is an intense, concentrated and focused experience in the diagnosis, surgical, non-surgical management, and follow-up care of the entire spectrum of vascular surgical diseases. The fellow is not expected to take in-house call, but is expected to be available on a first-call basis for vascular emergencies, 6 days of every week, excluding vacation weeks. The fellow is responsible to and under the supervision of the various attendings whose patients he/she is caring for, and ultimately to the Vascular Program Director.

Fellows will be monitored for their continued competence in medical knowledge, patient care, communication, professionalism, practice based learning and improvement, systems based practice and technical skills throughout training as outlined in goals and objectives for competencies.

During clinical rotations, the fellow is expected to participate in the pre, peri and post-operative care of vascular patients of the full-time faculty. He/she is also responsible for assigning junior residents to surgeries, which he/she is not planning to do. All junior residents on the service are under the supervision of the fellow, and the fellow makes rounds, sees consults, and is responsible for all management decisions on the service. The fellow participates at least weekly in the outpatient offices.

The fellows split weekend clinical coverage. He/she is expected to attend and participate in all didactic and clinical conferences of the division, including Department of Surgery Grand Rounds, and Vascular Case Conference.

Evaluations

Fellows will be monitored and evaluated for their continued competence in the six core competencies of medical knowledge, patient care, communication, professionalism, practice based learning and improvement, systems-based practice and technical skills throughout training.

Supervision

Refer to Supervision Policy in Vascular Manual.

Research

The goal of the research component is to enhance the residents understanding of research methodology, to stimulate translational research, and to enhance the understanding of vascular biology and cellular mechanisms of disease.

This experience includes project selection, literature review, experimental design, data collection, analysis, presentation skills and manuscript preparation.

Non-Invasive Vascular Laboratory Conference			
(list topics for a complete academic year)			
Who is in charge of the conference:		Alexandre d'Audiffret	
Frequency of conferences : Monthly		Click here to enter text.	
Presenter			Title of Presentation
Name	Faculty or Resident	PGY	
Dr. d'Audiffret			Principles of Doppler Ultrasound
Dr. Huseynova			Cerebrovascular Color Duplex Scanning and Interpretation
Dr. Marone			Venous Duplex Imaging of the upper and lower extremity
Dr. Zimmerman			Imaging Methods for Venous Insufficiency
Dr. Pillai			Physiologic Arterial Testing
Dr. d'Audiffret			Color Duplex Imaging of the lower extremity
Dr. Huseynova			Arterial Bypass grafts and stents
Dr. Marone			Arterial Evaluation of the Upper extremity
Dr. Zimmerman			Vasculogenic Impotence
Dr. Pillai			Hemodialysis access fistulas and grafts
Dr. d'Audiffret			Abdominal Doppler Fundamentals
Dr. Huseynova			Transcranial Doppler

CLINICAL ROTATION

Endovascular training

Endovascular procedures are typically performed in the angiography suite or in a hybrid room located in the operating room behind the line. In the first year, the vascular resident masters basic endovascular skills and begins to learn advanced skills.

At the conclusion of the first 12-month rotation, the fellow will be:

- knowledgeable in endovascular management including basic and advanced catheterization skills, principles of diagnostic and therapeutic procedures including angioplasty, stenting, thrombolytic therapy, embolization, laser plaque ablation, and aortic endo-grafting including the thoracic and abdominal aorta using simple and branched grafts.

Non-invasive Vascular Laboratory

During this rotation, the fellow will read basic texts on vascular noninvasive imaging, review all studies performed at the listed site which are done on a daily basis. He/she will review his interpretation with the reading faculty for the week and will document interpretation.

At the conclusion of the first 6-month rotation, the fellow will:

- be able to deal with ultrasound-guided interventions.
- have acquired knowledge of ultrasound physics as it applies to current established techniques of vascular diagnosis.
- be familiar with all major forms of instrumentation associated with routine noninvasive vascular diagnosis, including plethysmography, continuous-wave and pulsed Doppler, and Color-flow duplex ultrasound scan technology.
- be able to perform and interpret the results of noninvasive testing modalities performed for major non-cardiac vascular disorders.
- have a basic knowledge of ultrasound physics.

Diagnostic Angiography

Fellows will perform all diagnostic and therapeutic angiograms with the vascular faculty. Fellows will have already completed the radiation safety course. Fellows will select 2-3 cases to present at weekly vascular rounds.

At the conclusion of this rotation, the fellow will:

- Be comfortable with diagnostic endovascular procedures, including aortograms and runoff as well as venograms and fistulograms.

Open Cases

During this first year rotation, the fellow will participate in open cases. He/she is expected to participate in the pre, peri and post-operative care of vascular patients of the faculty. The fellow also participates in the care of patients from voluntary faculty. He/she is also responsible for assigning junior residents to surgeries, which he/she is not planning to do. All junior residents on the service are under the supervision of the fellow, and the fellow makes rounds, sees consults, and is responsible for all management decisions on the service.

At the conclusion of the rotation, the fellow will:

- be comfortable with AV access and basic LE bypass.

Outpatient Clinic

The fellow participates at least weekly in the outpatient offices of the faculty. He/she should begin to learn the evaluation of patients with aneurysmal and/or peripheral arterial disease with regard to medical management testing preoperative preparation. The fellow should become familiar with evaluation of patients with venous diseases and TOS.

SECOND YEAR OF TRAINING – PGY-VII

YEAR 2	Primary Activity
July	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures
August	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures
September	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures
October	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures
November	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures
December	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures
January	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures
February	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures
March	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures
April	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures
May	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures
June	Ruby Memorial Hospital – Open Surgeries, Endovascular procedures

GENERAL INFORMATION

Didactic Experiences

The resident is responsible for choosing case presentations and topics for the weekly main Vascular Conference, and coordinating preparations and topics of educational materials for discussion. Topics will be reviewed with the Program Director at the beginning of each year. The fellow is also responsible for presenting at the Vascular Mortality and Morbidity Conference and attending the joint conference with the general surgery residents. Fellows are expected to attend and present at the plenary session of the yearly regional Heart and Vascular Update Symposium.

Endovascular Procedures

During the year the vascular fellow performs diagnostic and therapeutic angiography.

- A substantial number of aortic endograft procedures and thoracic endograft will be preformed. Aortic and peripheral stent graft procedures are performed routinely at our training site. Trainees have experience with all FDA approved endograft and stent graft devices available including fenestrated grafts.
- Upon completion of the training program, the vascular fellow will have both the skills and experience to qualify for independent performance of all approved percutaneous interventions and aortic endografting based upon all current established credentialing guidelines.

Inpatient Management

The vascular fellow serves as a supervisory resident in the clinical management of all inpatients on the teaching Vascular Surgery service.

Outpatient Experience

The vascular fellow participates in the weekly outpatient clinical activities at the offices of the full-time faculty Clinic. The resident examines and evaluates patients and confers with the attending staff to plan further diagnostic evaluation and treatment.

Evaluations

Fellows will be monitored and evaluated for their continued competence in the six core competencies of medical knowledge, patient care, communication, professionalism, practice based learning and improvement, and systems based practice and technical skills throughout training.

Supervision

Refer to Supervision Policy in Vascular Manual.

Research

The goal of the research component is to enhance the residents understanding of research methodology, and to stimulate translational research.

This experience includes project selection, literature review, experimental design, data collection, analysis, presentation skills and manuscript preparation.

At the conclusion of the second year the fellow will have:

- completed and submitted research initiated during the first year which is suitable for publication and presentation.

CLINICAL ROTATION

The fellow will participate in open major vascular procedures, thoracoabdominal aneurysms, and thoracic outlet procedures as well as procedures for venous disease, and traumatic vascular injuries. The fellow will participate in complex endovascular procedures including fenestrated aortic endografting.

The fellow will participate in the assessment and treatment of pediatric vascular disease including traumatic vascular injuries.

The fellow will continue to perform diagnostic and therapeutic angiography whether in the hybrid room or in the angiography suite.

The fellow will be expected to read all vascular lab studies every Monday and Friday, with the reading faculty.

The fellow will attend office hours with the faculty once a week.

During the last 6 months of the second year of training, the fellow will have increased independence with primary responsibility for the entire management of the Vascular Surgery Service. This includes performing both as a primary surgeon and teaching assistant on appropriate cases, seeing all consults to the vascular surgery service and supervising a weekly ½ day clinic. The fellow will be expected to make all primary management decisions independently, including decisions regarding type and timing of surgical procedures, with consultation from the attending staff. Ultimate authority for clinical decisions remains with the attending staff. The fellow again is involved with endovascular procedures under the guidance of full time faculty.

The fellow should be able to complete all procedures, both endo and open with minimal to no assistance required from faculty. It is expected that the fellow be able to take a junior resident through simple cases. The vascular fellow performs all categories of major vascular surgical procedures under the direct supervision of the attending staff. Surgical case totals are generally balanced with regard to case mix (e.g. carotid, aortic, extremities).

It is expected that by the end of the second clinical year, the fellow:

- Will have met all the requirements for diagnostic angiography and is comfortable performing these procedures.
- Is comfortable with more complex endovascular procedures such as subintimal angioplasties and stenting.
- Will have an understanding of the evaluation and testing required for patients undergoing aortic, cerebrovascular, and peripheral vascular procedures.
- Will be competent with the treatment of venous disease insufficiency and varicose veins.
- Will be competent with the evaluation and treatment of thoracic outlet diseases.
- Diagnose and recommend management for open aortic intervention.

- Define options for managing ruptured aortic aneurysms.
- Discuss complex vascular disorders such as carotid body tumors, thoracic aortic diseases.
- Understand diagnosis and treatment of children with vascular diseases.
- Communicate effectively with patients and patient's families regarding care.
- Complete documentation on a timely basis for patient care.
- Be comfortable with operative note dictation.
- Communicate with referring physicians and consultants regarding patient care.