

Effective for residents who enter training on or after July 1, 2021.

DEFINITION

Vascular Surgery is the surgical specialty concerned with the diagnosis and management of diseases of the arterial, venous, and lymphatic vascular systems.

VASCULAR SURGERY PRACTICE

Vascular surgeons provide care for patients of all ages with acute and chronic conditions of the arterial, venous, and lymphatic systems in all regions of the body, excluding the heart and brain. This includes vascular disease of any origin, including arterial occlusive disease, aneurysmal disease, congenital vascular disorders, disorders of venous and lymphatic drainage, traumatic conditions of the vascular system, as well as dialysis access and lower extremity wound management.

Vascular surgeons provide consultation for patients with emergent, urgent, and non-urgent presentations; this includes life- or limb-threatening presentations. Vascular surgeons perform a clinical assessment, select appropriate investigations, interpret the results, and synthesize the clinical information to develop a management plan. They provide acute and long-term management, including pre- and post-operative care, long-term follow-up, and active surveillance. Treatments include medical therapies and endovascular and surgical interventions. Vascular surgeons perform and interpret non-invasive vascular diagnostic examinations. They may operate diagnostic laboratories for arterial and venous studies.

Vascular surgeons practice in academic and large community hospitals, where patients can receive the full range of diagnostic services and acute and intensive care, and have access to the collaborative care of interprofessional teams necessary to achieve excellent clinical results.

The patient population served by Vascular Surgery has a high prevalence of comorbidities and complex care needs. Providing optimal care for this population requires that vascular surgeons work effectively within a team of physicians and surgeons, both primary care physicians and other specialists, as well as other health care professionals, including nurses, rehabilitation professionals, social workers, and vascular laboratory technologists.

VASCULAR SURGERY COMPETENCIES

Medical Expert

Definition:

As *Medical Experts*, vascular surgeons integrate all of the CanMEDS Roles, applying medical knowledge, clinical skills, and professional values in their provision of high-quality and safe patient-centred care. Medical Expert is the central physician Role in the CanMEDS Framework and defines the physician's clinical scope of practice.

Key and Enabling Competencies: Vascular surgeons are able to...

1. Practise medicine within their defined scope of practice and expertise

- 1.1. Demonstrate a commitment to high-quality care of their patients
- 1.2. Integrate the CanMEDS Intrinsic Roles into their practice of Vascular Surgery
- 1.3. Apply the competencies of Surgical Foundations
- 1.4. Apply knowledge of the clinical and biomedical sciences relevant to Vascular Surgery
 - 1.4.1. Anatomy, physiology, and pathophysiology of the vascular system in health and disease
 - 1.4.1.1. Arterial, venous, and lymphatic biology
 - 1.4.1.2. Hemodynamics
 - 1.4.1.3. Ischemia-related organ dysfunction
 - 1.4.2. Pathophysiology of coagulation disorders and their effect on the vascular system
 - 1.4.3. Microbiology of community- and hospital-acquired infections
 - 1.4.4. Principles of antimicrobial prophylaxis, antibiotic stewardship, and infection control
 - 1.4.5. Epidemiology, natural history, and response to treatment of vascular disease in different sexual, racial, and cultural groups
 - 1.4.6. Risk factor, risk stratification, and risk factor modification in patients with vascular disease
 - 1.4.6.1. Biologic effects of lifestyle choices on the cardiovascular system, including the role of smoking, diet, and exercise
 - 1.4.6.2. Hyperlipidemia

- 1.4.7. Principles of noninvasive and invasive vascular diagnostic modalities, including indications, benefits, and risks of the investigations
 - 1.4.7.1. Physics and instrumentation of ultrasound, including two-dimensional and Doppler
 - 1.4.7.2. Quality assurance, quality control, and testing of vascular diagnostic equipment
- 1.4.8. Fundamental knowledge of imaging modalities, techniques, and contrast agents, including benefits and risks, for care of vascular surgery patients
 - 1.4.8.1. Radiography, including fluoroscopy
 - 1.4.8.2. Computed tomography (CT)
 - 1.4.8.3. Magnetic resonance imaging (MRI)
 - 1.4.8.4. Angiography
- 1.4.9. Pharmacology, including pharmacokinetics, pharmacodynamics, mechanism of action, and adverse effects of medications used in Vascular Surgery
- 1.4.10. Therapeutic options for patients with vascular disease, including indications for, and benefits and risks of, operative and non-operative treatments
- 1.4.11. Behaviour and complications of biological and synthetic grafts and intravascular devices
- 1.4.12. Principles of radiation safety and protection
- 1.4.13. Principles of biostatistics and epidemiology
- 1.5. Perform appropriately timed clinical assessments with recommendations that are presented in an organized manner
- 1.6. Carry out professional duties in the face of multiple competing demands
 - 1.6.1. Prioritize patients on the basis of the acuity and severity of their clinical presentations
- 1.7. Recognize and respond to the complexity, uncertainty, and ambiguity inherent in Vascular Surgery practice

2. Perform a patient-centred clinical assessment and establish a management plan

- 2.1. Prioritize issues to be addressed in a patient encounter
 - 2.1.1. Determine the acuity of the condition(s) and the priorities for patient care

VASCULAR SURGERY COMPETENCIES (2021)

- 2.2. Elicit a history, perform a physical exam, select appropriate investigations, and interpret their results for the purpose of diagnosis and management, disease prevention, and health promotion
 - 2.2.1. Gather relevant clinical history
 - 2.2.2. Explore and consider the implications of pre-existing medical conditions
 - 2.2.3. Identify and interpret clinically significant findings on a physical examination, including Doppler examination
 - 2.2.4. Select and interpret the results of diagnostic imaging, including invasive and non-invasive modalities
 - 2.2.4.1. Radiography
 - 2.2.4.2. Ultrasound
 - 2.2.4.3. Computed tomography (CT)
 - 2.2.4.4. Magnetic resonance imaging (MRI)
 - 2.2.4.5. Angiography, including venography and arteriography
 - 2.2.5. Synthesize patient information to assess peri-operative risk and determine suitability for non-operative, endovascular, or open surgical management
- 2.3. Establish goals of care in collaboration with patients and their families,¹ which may include slowing disease progression, treating symptoms, achieving cure, improving function, and palliation
 - 2.3.1. Determine a patient's wishes related to treatment, with a shared understanding of conservative versus endovascular or open surgery options
 - 2.3.2. Determine a patient's wishes related to end-of-life care and support the provision of palliative care
- 2.4. Establish a patient-centred management plan for patients with
 - 2.4.1. Abdominal aortic and iliac aneurysms
 - 2.4.2. Aortoiliac occlusive disease, both acute and chronic
 - 2.4.3. Upper and lower extremity arterial occlusive disease
 - 2.4.4. Thoracic aortic pathology
 - 2.4.5. Visceral arterial disease
 - 2.4.6. Extracranial cerebrovascular disease
 - 2.4.7. End-stage renal disease requiring hemodialysis access

¹ Throughout this document, references to the patient's family are intended to include all those who are personally significant to the patient and are concerned with his or her care, including, according to the patient's circumstances, family members, partners, caregivers, legal guardians, and substitute decision-makers.

- 2.4.8. Vascular injury, traumatic or iatrogenic and reconstruction after oncologic surgery
- 2.4.9. Chronic venous disease
- 2.4.10. Acute venous disease
- 2.4.11. Vascular malformations and congenital anomalies
- 2.4.12. Nonatheromatous vascular disease
- 2.4.13. Lymphatic disorders

3. Plan and perform procedures and therapies for the purpose of assessment and/or management

- 3.1. Determine the most appropriate procedures or therapies
 - 3.1.1. Risk factor modification
 - 3.1.2. Medical management
 - 3.1.3. Open intervention
 - 3.1.4. Endovascular intervention
 - 3.1.5. Hybrid intervention, combining open and endovascular approaches
- 3.2. Obtain and document informed consent, explaining the risks and benefits of, and the rationale for, a proposed procedure or therapy
- 3.3. Prioritize procedures or therapies, taking into account clinical urgency and available resources
- 3.4. Perform procedures in a skilful and safe manner, adapting to unanticipated findings or changing clinical circumstances

Open surgical procedures

- 3.4.1. Arterial and venous repair and reconstruction, including
 - 3.4.1.1. Arterial exposure and control
 - 3.4.1.2. Autogenous and prosthetic reconstruction and repair
 - 3.4.1.3. Endarterectomy
 - 3.4.1.4. Patch angioplasty
 - 3.4.1.5. Embolectomy/thrombectomy
 - 3.4.1.6. Bypass using autologous vein or prosthetic material
 - 3.4.1.7. Aneurysm repair
 - 3.4.1.8. Venous intervention, using a variety of techniques
- 3.4.2. Hemodialysis access
- 3.4.3. Amputation: minor and major

- 3.4.4. Fasciotomy
- 3.4.5. Decompression procedures, including thoracic outlet syndrome and median arcuate ligament syndrome
- 3.4.6. Complex wound closure

Endovascular interventions

- 3.4.7. Arterial and venous access techniques
- 3.4.8. Arterial and venous balloon angioplasty
- 3.4.9. Arterial and venous stenting
- 3.4.10. Arterial endovascular control
- 3.4.11. Aortic endovascular treatment
- 3.4.12. Percutaneous vessel closure
- 3.4.13. Thrombectomy/atherectomy/embolectomy
- 3.4.14. Thrombolysis
- 3.4.15. Therapeutic vascular embolization
- 3.4.16. Venous ablation techniques

Hybrid procedures

- 3.4.17. Open and endovascular techniques used in combination

4. Establish plans for ongoing care and, when appropriate, timely consultation

- 4.1. Implement a patient-centred care plan that supports ongoing care, follow-up on investigations, response to treatment, and further consultation
 - 4.1.1. Recognize and manage complications of interventions and treatments
 - 4.1.2. Determine the need and appropriate timing of referral to other health care providers
 - 4.1.3. Arrange for surveillance of patients, as appropriate

5. Actively contribute, as an individual and as a member of a team providing care, to the continuous improvement of health care quality and patient safety

- 5.1. Recognize and respond to harm from health care delivery, including patient safety incidents
 - 5.1.1. Report patient safety incidents using appropriate institutional procedures
 - 5.1.2. Identify potential improvement opportunities arising from patient safety incidents and near misses

- 5.2. Adopt strategies that promote patient safety and address human and system factors
 - 5.2.1. Adhere to occupational and radiation safety procedures to ensure patient, personal, and team safety

Communicator

Definition:

As *Communicators*, vascular surgeons form relationships with patients and their families that facilitate the gathering and sharing of essential information for effective health care.

Key and Enabling Competencies: Vascular surgeons are able to...

1. Establish professional therapeutic relationships with patients and their families

- 1.1. Communicate using a patient-centred approach that encourages patient trust and autonomy and is characterized by empathy, respect, and compassion
- 1.2. Optimize the physical environment for patient comfort, dignity, privacy, engagement, and safety
- 1.3. Recognize when the perspectives, values, or biases of patients, patients' families, physicians, or other health care professionals may have an impact on the quality of care, and modify the approach to the patient accordingly
- 1.4. Respond to a patient's non-verbal behaviours to enhance communication
- 1.5. Manage disagreements and emotionally charged conversations
- 1.6. Adapt to the unique needs and preferences of each patient and to each patient's clinical condition and circumstances

2. Elicit and synthesize accurate and relevant information, incorporating the perspectives of patients and their families

- 2.1. Use patient-centred interviewing skills to effectively gather relevant biomedical and psychosocial information
- 2.2. Provide a clear structure for and manage the flow of an entire patient encounter
- 2.3. Seek and synthesize relevant information from other sources, including the patient's family, with the patient's consent

3. Share health care information and plans with patients and their families

- 3.1. Share information and explanations that are clear, accurate, and timely, while assessing for patient and family understanding
 - 3.1.1. Convey diagnosis and prognosis clearly and compassionately
 - 3.1.2. Explain treatment options, including non-operative management and endovascular and open surgical procedures

3.1.3. Use appropriate language and terminology to optimize patient and family understanding

3.2. Disclose harmful patient safety incidents to patients and their families accurately and appropriately

4. Engage patients and their families in developing plans that reflect the patient's health care needs and goals

4.1. Facilitate discussions with patients and their families in a way that is respectful, non-judgmental, and culturally safe

4.2. Assist patients and their families to identify, access, and make use of information and communication technologies to support their care and manage their health

4.3. Use communication skills and strategies that help patients and their families make informed decisions regarding their health

4.3.1. Facilitate shared decision-making with patients regarding their wishes related to unexpected and critical complications of vascular disease

5. Document and share written and electronic information about the medical encounter to optimize clinical decision-making, patient safety, confidentiality, and privacy

5.1. Document clinical encounters in an accurate, complete, timely, and accessible manner, in compliance with regulatory and legal requirements

5.1.1. Document discussions regarding informed consent in an accurate and complete manner

5.1.2. Prepare concise, clear descriptions of surgical procedures

5.1.3. Prepare consultation, discharge, progress, or clinic notes that are well organized, document all relevant findings, and provide a plan for ongoing management

5.1.4. Provide clear, concise, and timely reports of non-invasive vascular diagnostic studies

5.1.5. Communicate critical findings or unexpected results in a timely manner

5.2. Communicate effectively using a written health record, electronic medical record, or other digital technology

5.3. Share information with patients and others in a manner that enhances understanding and that respects patient privacy and confidentiality

Collaborator

Definition:

As *Collaborators*, vascular surgeons work effectively with other health care professionals to provide safe, high-quality, patient-centred care.

Key and Enabling Competencies: Vascular surgeons are able to...

1. Work effectively with physicians and other colleagues in the health care professions

- 1.1. Establish and maintain positive relationships with physicians and other colleagues in the health care professions to support relationship-centred collaborative care
- 1.2. Negotiate overlapping and shared responsibilities with physicians and other colleagues in the health care professions in episodic and ongoing care
 - 1.2.1. Make effective use of the scope and expertise of other health care professionals
 - 1.2.2. Delegate responsibilities respectfully to members of the interprofessional health care team
- 1.3. Engage in respectful shared decision-making with physicians and other colleagues in the health care professions
 - 1.3.1. Contribute surgical expertise to interprofessional teams
 - 1.3.2. Consult with colleagues and other specialists with regard to the patient's medical and surgical issues
 - 1.3.3. Consult with other health professionals with regard to the patient's social, rehabilitative, and nutritional concerns

2. Work with physicians and other colleagues in the health care professions to promote understanding, manage differences, and resolve conflicts

- 2.1. Show respect toward collaborators
- 2.2. Implement strategies to promote understanding, manage differences, and resolve conflict in a manner that supports a collaborative culture

3. Hand over the care of a patient to another health care professional to facilitate continuity of safe patient care

- 3.1. Determine when care should be transferred to another physician or health care professional

- 3.2. Demonstrate safe handover of care, using both oral and written communication, during a patient transition to a different health care professional, setting, or stage of care
 - 3.2.1. Provide safe handover of care of the post-operative patient to the post-anesthetic care or critical care team, summarizing clinical information and anticipating plans for ongoing care
 - 3.2.2. Provide clear reports when transferring care to the primary health care provider, including plans for anticoagulation, infection prophylaxis, and ongoing monitoring, as relevant

Leader

Definition:

As *Leaders*, vascular surgeons engage with others to contribute to a vision of a high-quality health care system and take responsibility for the delivery of excellent patient care through their activities as clinicians, administrators, scholars, or teachers.

Key and Enabling Competencies: Vascular surgeons are able to...

1. Contribute to the improvement of health care delivery in teams, organizations, and systems

- 1.1. Apply the science of quality improvement to systems of patient care
 - 1.1.1. Identify potential improvement opportunities arising from the review of patient outcomes
 - 1.1.2. Apply guidelines for reporting surgical results
- 1.2. Contribute to a culture that promotes patient safety
 - 1.2.1. Participate in quality assurance rounds
- 1.3. Analyze patient safety incidents to enhance systems of care
- 1.4. Use health informatics to improve the quality of patient care and optimize patient safety

2. Engage in the stewardship of health care resources

- 2.1. Allocate health care resources for optimal patient care
 - 2.1.1. Prioritize waiting lists effectively to meet the needs of their patient population
- 2.2. Apply evidence and management processes to achieve cost-appropriate care

3. Demonstrate leadership in health care systems

- 3.1. Demonstrate leadership skills to enhance health care
 - 3.1.1. Apply knowledge of the administrative organization of health care delivery and the human and technological resources required to operate an effective vascular surgery practice
- 3.2. Facilitate change in health care to enhance services and outcomes

4. Manage career planning, finances, and health human resources in personal practice(s)

- 4.1. Set priorities and manage time to integrate practice and personal life
- 4.2. Manage personal professional practice(s) and career
 - 4.2.1. Assume a leadership role in the management of complex cases
 - 4.2.2. Apply leadership skills to optimize patient care on the vascular surgery service, including the inpatient service, clinic, and operating room
 - 4.2.3. Apply knowledge of the financial and administrative aspects of vascular surgery practice
- 4.3. Implement processes to ensure personal practice improvement

Health Advocate

Definition:

As *Health Advocates*, vascular surgeons contribute their expertise and influence as they work with communities or patient populations to improve health. They work with those they serve to determine and understand needs, speak on behalf of others when required, and support the mobilization of resources to effect change.

Key and Enabling Competencies: Vascular surgeons are able to...

1. Respond to an individual patient's health needs by advocating with the patient within and beyond the clinical environment

- 1.1. Work with patients to address determinants of health that affect them and their access to needed health services or resources
 - 1.1.1. Facilitate timely patient access to services and resources, including rehabilitation services
- 1.2. Work with patients and their families to increase opportunities to adopt healthy behaviours
 - 1.2.1. Work with patients to address risk factors for vascular disease

- 1.3. Incorporate disease prevention, health promotion, and health surveillance into interactions with individual patients
 - 1.3.1. Promote primary and secondary prevention strategies for vascular disease, including evidence-based screening practices
- 2. Respond to the needs of the communities or populations they serve by advocating with them for system-level change in a socially accountable manner**
 - 2.1. Work with a community or population to identify the determinants of health that affect them
 - 2.2. Improve clinical practice by applying a process of continuous quality improvement to disease prevention, health promotion, and health surveillance activities
 - 2.3. Contribute to a process to improve health in the community or population they serve

Scholar

Definition:

As *Scholars*, vascular surgeons demonstrate a lifelong commitment to excellence in practice through continuous learning, and by teaching others, evaluating evidence, and contributing to scholarship.

Key and Enabling Competencies: Vascular surgeons are able to...

- 1. Engage in the continuous enhancement of their professional activities through ongoing learning**
 - 1.1. Develop, implement, monitor, and revise a personal learning plan to enhance professional practice
 - 1.1.1. Develop strategies to maintain an up-to-date evidence-based practice, considering that diagnostic and therapeutic modalities will change throughout the physician's career
 - 1.2. Identify opportunities for learning and improvement by regularly reflecting on and assessing their performance using various internal and external data sources
 - 1.3. Engage in collaborative learning to continuously improve personal practice and contribute to collective improvements in practice
- 2. Teach students, residents, the public, and other health care professionals**
 - 2.1. Recognize the influence of role-modelling and the impact of the formal, informal, and hidden curriculum on learners

- 2.2. Promote a safe learning environment
 - 2.2.1. Advocate for the educational needs of learners in Vascular Surgery
- 2.3. Ensure patient safety is maintained when learners are involved
- 2.4. Plan and deliver learning activities
- 2.5. Provide feedback to enhance learning and performance
- 2.6. Assess and evaluate learners, teachers, and programs in an educationally appropriate manner

3. Integrate best available evidence into practice

- 3.1. Recognize practice uncertainty and knowledge gaps in clinical and other professional encounters and generate focused questions that can address them
- 3.2. Identify, select, and navigate pre-appraised resources
- 3.3. Critically evaluate the integrity, reliability, and applicability of health-related research and literature
 - 3.3.1. Identify appropriate use of biostatistics and epidemiologic measures as they apply to clinical research and reviews related to Vascular Surgery
- 3.4. Integrate evidence into decision-making in their practice
 - 3.4.1. Evaluate and adopt, as appropriate, emerging investigations and interventions

4. Contribute to the creation and dissemination of knowledge and practices applicable to health

- 4.1. Demonstrate an understanding of the scientific principles of research and scholarly inquiry and the role of research evidence in health care
- 4.2. Identify ethical principles for research and incorporate them into obtaining informed consent, considering potential harms and benefits, and considering vulnerable populations
- 4.3. Contribute to the work of a research program
- 4.4. Pose questions amenable to scholarly investigation and select appropriate methods to address them
- 4.5. Summarize and communicate to professional and lay audiences, including patients and their families, the findings of relevant research and scholarly inquiry

Professional

Definition:

As *Professionals*, vascular surgeons are committed to the health and well-being of individual patients and society through ethical practice, high personal standards of behaviour, accountability to the profession and society, physician-led regulation, and maintenance of personal health.

Key and Enabling Competencies: Vascular surgeons are able to...

1. Demonstrate a commitment to patients by applying best practices and adhering to high ethical standards

- 1.1. Exhibit appropriate professional behaviours and relationships in all aspects of practice, demonstrating honesty, integrity, humility, commitment, compassion, respect, altruism, respect for diversity, and maintenance of confidentiality
- 1.2. Demonstrate a commitment to excellence in all aspects of practice
- 1.3. Recognize and respond to ethical issues encountered in practice
- 1.4. Recognize and manage conflicts of interest
- 1.5. Exhibit professional behaviours in the use of technology-enabled communication

2. Demonstrate a commitment to society by recognizing and responding to societal expectations in health care

- 2.1. Demonstrate accountability to patients, society, and the profession by responding to societal expectations of physicians
- 2.2. Demonstrate a commitment to patient safety and quality improvement

3. Demonstrate a commitment to the profession by adhering to standards and participating in physician-led regulation

- 3.1. Fulfil and adhere to professional and ethical codes, standards of practice, and laws governing practice
 - 3.1.1. Abide by accepted guidelines on ethical interactions with industry with respect to research, education, and clinical care
 - 3.1.2. Adhere to regulations regarding the use of approved and investigational devices
- 3.2. Recognize and respond to unprofessional and unethical behaviours in physicians and other colleagues in the health care professions
- 3.3. Participate in peer assessment and standard setting

4. Demonstrate a commitment to physician health and well-being to foster optimal patient care

- 4.1. Exhibit self-awareness and manage influences on personal well-being and professional performance
 - 4.1.1. Develop effective strategies to monitor fatigue and mitigate its effects on clinical performance
 - 4.1.2. Demonstrate knowledge of occupational hazards for vascular surgeons and implement measures to minimize those risks
 - 4.1.3. Maintain capacity for professional clinical performance in challenging or stressful situations
 - 4.1.4. Apply strategies to mitigate the personal impact of patient adverse outcomes and safety incidents
- 4.2. Manage personal and professional demands for a sustainable practice throughout the physician life cycle
- 4.3. Promote a culture that recognizes, supports, and responds effectively to colleagues in need

This document is to be reviewed by the Specialty Committee in Vascular Surgery by December 2021.

APPROVED – Specialty Standards Review Committee – August 2019

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