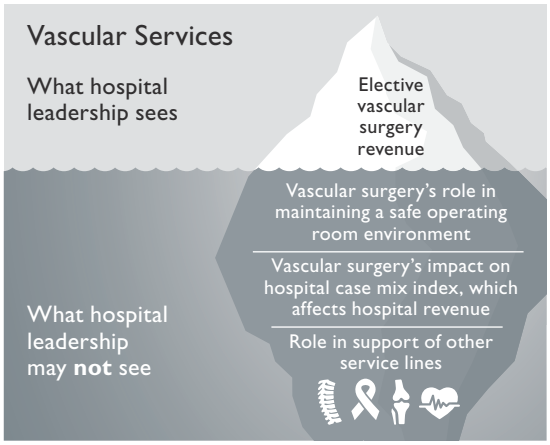
VALUE OF VASCULAR SURGERY

An essential component of a high-performing hospital's surgical program

Capture the Opportunity

Vascular surgery's importance to a hospital's overall surgical performance is significant and ever-increasing. Yet, at the same time, this discipline remains one of the least recognized and most misunderstood specialties by the majority of health care systems across the country. While the value and importance of vascular surgery takes many forms, there are 3 overriding characteristics that speak to the increasing—and increasingly essential—role that vascular surgeons play in a hospital's success:

- Improve quality, outcomes and safety associated with the operating room environment.
  - ***Lower OR morbidity and mortality rates.***
- Support and enable many other procedures across a wide range of specialties outside of vascular services (eg, spine, trauma, cardiovascular, orthopedics, dialysis and oncology.)
- Provide a significant growth engine for a hospital due to the increasing prevalence and incidence of vascular disease and the collaborative services they provide.



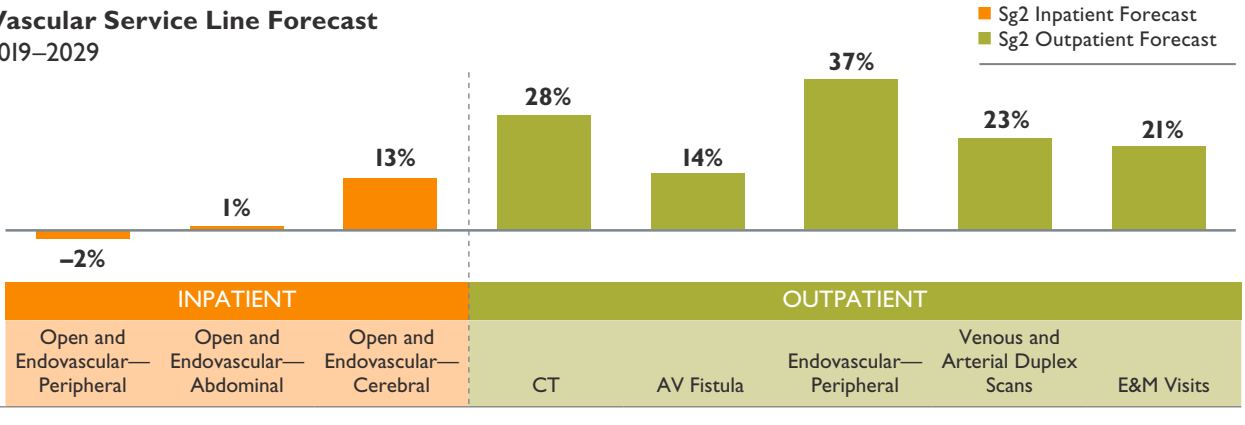
Vascular surgeons are well suited to provide both medical and procedural-based care to vascular patients across the continuum of care, from risk management to highly complex endovascular and open procedures. They provide these key services in the hospital, but also in locations that expand their business into the community, such as the office, diagnostic center and, for procedures, office-based lab (OBL) settings. They treat a wide spectrum of diseases that are increasing in both prevalence and incidence, making this an organic growth opportunity (see Figure 1) as well as a way to better manage an increasingly comorbid and complex patient population.

Vascular Disease Prevalence and Incidence

- Peripheral artery disease (PAD) affects close to 8.5 million American adults aged 40 years or older.
- The age-standardized prevalence rate of PAD is approximately 185 per 100,000 people and similar across genders, with minimal change between 1990 and 2010.
- The risk factors for PAD are similar to those for coronary heart disease (CHD); diabetes and smoking are stronger risk factors for PAD than for CHD.

FIGURE 1. VASCULAR SERVICE LINE 10-YEAR FORECAST

IP and OP Vascular Service Line Forecast
US Market, 2019–2029



	Open and Endovascular—Peripheral	Open and Endovascular—Abdominal	Open and Endovascular—Cerebral	CT	AV Fistula	Endovascular—Peripheral	Venous and Arterial Duplex Scans	E&M Visits
2019 Volumes	194K	148K	144K	1.0M	1.0M	505K	16M	12.1M

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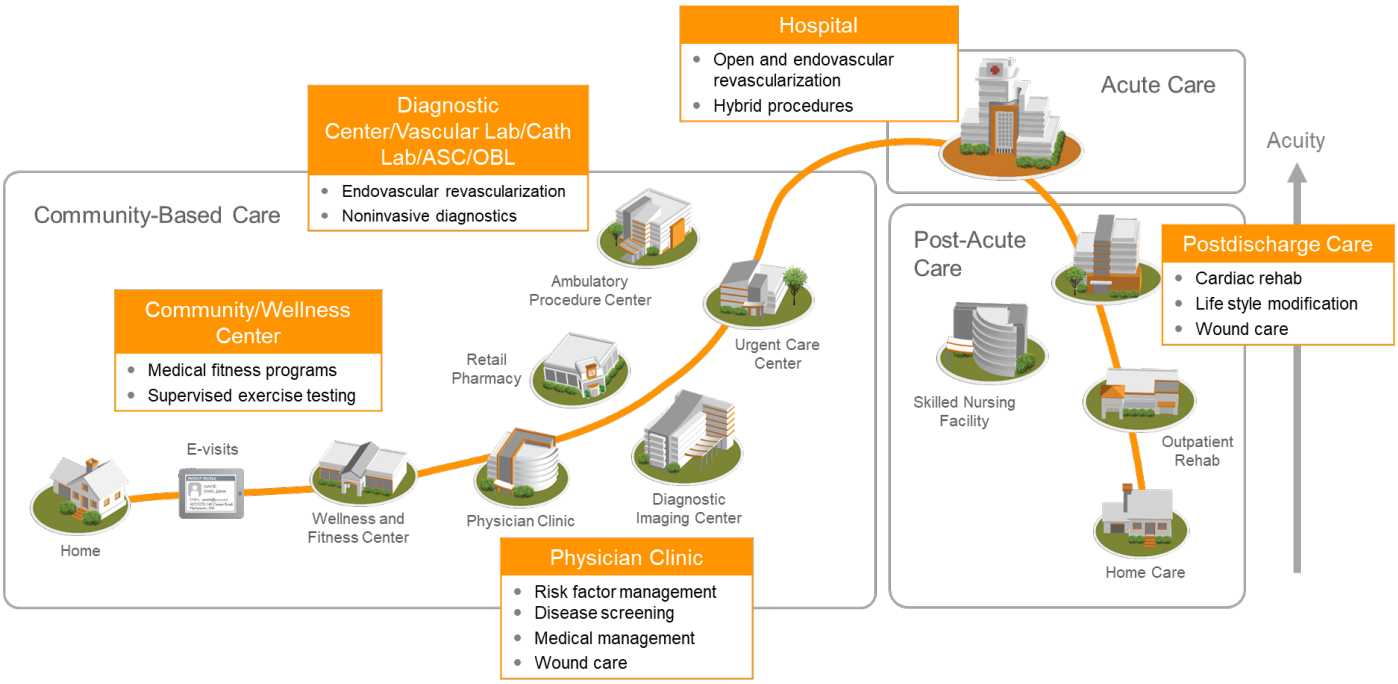
Vascular Surgery Integration

While only 8% of vascular surgeons operate in a vascular service line or program structure, the establishment of a true vascular program brings transparency to all services across the care continuum. In addition, it provides the much-needed recognition of the importance of vascular surgery while also ensuring that resources are available to support cost, quality and market initiatives. Due to the nature of vascular surgery, program development is often multidisciplinary but led by a vascular surgeon if available (See Table 1).

TABLE 1. VASCULAR SURGERY SERVICES ACROSS THE CARE CONTINUUM



Successful vascular programs may differ in terms of services, technologies and staffing based on resources available, market dynamics, patient population and physician skill set (see Table 2). Understanding your organization's capabilities will help align your goals and make investments necessary to deliver high-quality, low-cost services.

Vascular procedures are provided across multiple settings, from the hospital-based lab to the office-based lab/ambulatory surgery center (ASC) setting, with nearly 50% of OP endovascular peripheral procedures performed in the office/ASC setting. Vascular surgeons are increasingly comfortable supporting this shift given an adequate procedure room in which to work. As innovations continue to improve minimally invasive treatment options for patients, we will see continued shift of procedures to OP status and settings. This shift will be critical for hospitals to thrive financially as value-based care continues to emerge in the industry. Vascular surgery will play a key role in site of care transitions, optimal total cost of care per beneficiaries and improving key quality metrics.

TABLE 2. VASCULAR SERVICES PROGRAM TYPES AND DEFINITIONS

	OUTPATIENT	INPATIENT	COMPLEX INPATIENT
Services	• Endovascular Procedures — Aortoiliac occlusive — Infrainguinal arterial — Upper extremity arterial — Deep venous — Superficial venous — AV access • Noninvasive Vascular Diagnostics (Accredited by IAC/ACR) — Duplex ultrasound scans—carotid, renal, abdominal, mesenteric, extremity — Physiologic arterial studies • Angiography: arterial and venous • Supervised exercise training	• Endovascular and Open Procedures — Descending thoracic aorta (endo) — Aortoiliac occlusive and aneurysmal — Infrainguinal arterial — Upper extremity arterial — Carotid-vertebral — Deep venous — Superficial venous — AV Access — Thrombolytic infusion • 24/7/365 Emergency vascular coverage	• Complex Endovascular and Open Aortic Procedures — Aortic arch and proximal branches — Thoraco-abdominal repairs — Visceral aorta and branches — Descending thoracic aorta (open) — Neurointerventional • 24/7/365 Emergency vascular and cardiothoracic coverage • Clinical research
Technologies	• Duplex ultrasound • Fluoroscopy • ASC/office-based lab/hospital outpatient department	• CT and MRI • 3D CT • Endovascular suite/cath lab • Fixed and/or portable fluoroscopy • Inpatient and ICU beds • Intravascular ultrasound (IVUS) • Hybrid OR	• Cardiopulmonary bypass • Biplane angiography equipment • Transesophageal echo • Cerebral monitoring
Staffing	• Medical director • Program manager • Vascular technician(s) • Data abstractor	• Vascular surgeon—board certified • Vascular administrator • Vascular nurse coordinator • Anesthesiology	• ICU and critical care • Remote monitoring support • IT support across settings • Clinical research coordinator

ACR = American College of Radiology; IAC = Intersocietal Accreditation Commission.

Impact Summary

Vascular Surgery Financials

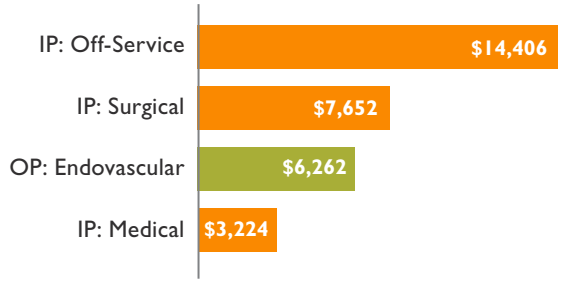
Vascular surgeons provide significant value, revenue and margin opportunity to a hospital.

- Previous research and current assessments suggest gross contribution margin per vascular surgeon FTE is the highest amongst the top 5 hospital-based surgical service lines (cardiology, general surgery, orthopedics, vascular, neurosurgery).
- On average, vascular contribution margins remain high at approximately 40% of overall revenue.
  - Contribution margins are positive across all procedure types (see Figure 2).
  - Survey data suggest that on average, 43% of vascular surgeon volumes are surgical with 57% endovascular.
  - Vascular programs can add more than $9 million in contribution margin to the hospital, based on average procedure mix and volume.
- In addition, vascular surgeons provide essential operative assistance to other surgical specialties resulting in a desirable per case contribution margin of 30% for supportive procedures and consults.
  - Survey data show the following as services that are dependent on a fully functioning vascular program: spine/spine exposures (70% of respondents support these cases), trauma (63%), cardiac surgery (60%), ortho (36%), dialysis (26%), urology (23%), neuro (23%), oncology (23%), TAVR (14%).

Vascular Surgery Demographics and Alignment

- Approximately 70% of vascular surgeons are employed by a hospital/health system/faculty plan.
- There is an acute and increasing shortage of vascular surgeons, and this situation is projected to exacerbate well into the middle of the decade.
- The Society for Vascular Surgery (SVS) reports that this deficit of vascular surgeons has resulted in at least one-third of hospitals in the country actively attempting to recruit a surgeon, a situation that enables the small number of available physicians to have their pick of organizations that meet their interests and skill sets, and offer strong program support.

FIGURE 2. VASCULAR: AVERAGE PER CASE CONTRIBUTION MARGIN



Set Yourself Up for Future Success

Vascular surgeons, and vascular surgery programs, are typically very profitable for a hospital. Vascular surgeons perform a greater proportion of surgical cases to endovascular cases than do other specialties that do vascular work, offering a hospital a greater margin opportunity. On average, the vascular surgery cases have a high case mix index, between 2.8 and 3.2, which is beneficial financially to an institution because it results in higher levels of hospital reimbursement. Additionally, a study conducted over the 3-year period of 2013 to 2015 to examine the cases (n=208) in which vascular surgery was called in a consultative role, found that the median contribution margin for these difficult and often life- and/or limb-saving cases was a healthy $14,406. The growth of vascular surgery cases, consequently, will result in favorable financial outcomes for hospitals. Ensuring that vascular surgeons remain busy and committed to an organization will require significant organizational support. Their availability and presence will benefit physicians and patients across a wide variety of hospital service lines and highlight vascular surgery's role in providing collaborative services broadly across an organization.

When looking at a hospital's financial performance, vascular surgery's importance is oftentimes not given its proper due. The off-service work of a vascular surgeon—that is, when a vascular surgeon is called upon to assist another specialist—may be unrecognized because the technical component of any off-service work goes to the primary procedural physician, not the vascular surgeon, who, in many cases, provides the emergent care to save a patient's life and/or limb. Moreover, the vascular surgeons on-site support and peri-procedural emergency services coverage will mitigate transferring cases to other facilities and contribute to the margin associated with service lines such as cardiac, spine, trauma and orthopedics.

In the increasingly competitive world of health care, being the first in the market to intensely focus on vascular surgery development can lower the total cost of care and improve quality while growing revenues and contribution margins, allowing an organization to remain relevant in the market.

FTE = full-time equivalent; TAVR = transcatheter aortic valve replacement.

Strategic Considerations

	OVERVIEW	ACTION STEPS
Program Components and Leadership	Vascular surgeons work across multiple services lines and perform a wide range of procedure types that necessitates a well-integrated approach.	• Vascular surgeons, due to their broad skill set, are well positioned to lead a multidisciplinary team of specialists to deliver high-quality and coordinated vascular services. Responsibilities include: — Manage process for determining the most appropriate procedure (eg, open vs endovascular procedures) based on a patient's symptoms and presentation, and current clinical guidelines. — Provide intraoperative consultation to rescue patients and surgeons when complex surgeries involve major vascular structures (nearly 75% of vascular surgeons offer urgent and elective consultative services). — Create clear credentialing requirements and standard protocols for all procedures across all specialists. • Vascular surgery leadership and input is critical to the successful provision of many services provided in hospitals both large and small, and vascular surgeons are uniquely positioned to help strategize and develop answers to health care delivery challenges due to the depth and breadth of both their training and experience.
Workforce	Harness the unique skill sets from vascular surgeons that enables them to support an organization in many ways.	• Maintain appropriate number of skilled staff to enable 24/7 emergency coverage while maintaining job satisfaction by spreading overnight call duty among a larger staff pool. — On average, vascular surgeons are on call 9 days per month, while only 30% are compensated for call coverage. • Develop formal agreements across specialties around block scheduling and access to procedure rooms (eg, cath lab, advanced radiology suite, hybrid OR). — Over 60% of vascular surgeons provide services at more than 2 hospitals. • Vascular surgeons are well versed in risk factor management, open and endovascular interventions, as well as long term follow-up of patients with vascular disease. • The current shortage of vascular surgeons is projected to worsen over the next decade.
Resources	Hospital and ambulatory settings are used to deliver innovative vascular screenings, diagnostics and treatments to patients across the care continuum.	• While hospital-based facilities are important to the delivery of high-acuity vascular care, over 30% of vascular surgeons have access to an office-based lab or ASC to perform lower-acuity procedures. • Nearly 75% of vascular surgeons have access to a hybrid OR. • Imaging and diagnostic services are provided by nearly 95% of vascular surgeons. • Screening services are offered by nearly 70% of vascular surgeons.

ACTION STEPS: THE TIME IS NOW

Engage your vascular surgery leadership proactively to capitalize on the immediate opportunity. Here are the key questions to ask your leadership team:

Strategy

What type of vascular surgery services do we offer today? Where do we want to take the program in the future?

Assessment

How do we compete in the market today? What resources do we need to be successful?

Governance

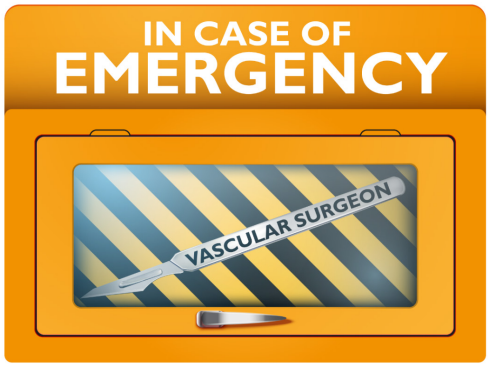
Do we have the governance structure and physician leadership to grow vascular surgery services?

Coordination

Who is delivering vascular surgery services today in our system? Are we coordinating care across the care continuum?

Physician Alignment

Do we have durable alignment with our vascular surgeons that will ensure long-term, high-quality surgical, medical and endovascular care to our community?



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Acknowledgments

Sg2 and the Society for Vascular Surgery partnered on the development of this report. Sg2, the health care industry's premier authority on health care trends, insights and market analytics, was primary author and used proprietary Impact of Change analytics and primary research to develop the information presented throughout the report. SVS provided clinical relevance, facilitated member interviews, and coordinated a broad SVS membership survey to support content development.

Sg2 Analysis Sources: Figure 1—**Note:** Analysis excludes 0–17 age group. Procedure volumes for CT and E&M are for the following CARE Families: Arterial Embolism, Disease of Venous System (Varicose Veins, Phlebitis, Hemorrhoids), Peripheral Vascular Disease and Aneurysms, and Venous Thromboembolism. All other procedures include volumes that fall across all diseases. **Sources:** Impact of Change®, 2019; HCUP National Inpatient Sample (NIS). Healthcare Cost and Utilization Project (HCUP) 2016. Agency for Healthcare Research and Quality, Rockville, MD; OptumInsight, 2017; The following 2017 CMS Limited Data Sets (LDS): Carrier, Denominator, Home Health Agency, Hospice, Outpatient, Skilled Nursing Facility; Claritas Pop-Facts®, 2019; Sg2 Analysis, 2019. Figure 2—**Sources:** Sg2 IP & OP Vascular Service Line US Market Forecast (IP: Open Surgical Peripheral & Abdominal, Endovascular Peripheral & Abdominal, Medical; OP: Endovascular Peripheral) averaged across an estimated 675 hospitals performing vascular surgery (ahd.com). Average contribution margin per case from Vizient Navigator proprietary all-payer database and SVS study; Johnson CE et al. *J Vasc Surg.* 2018;67(2):e31; Taylor et al. *J Vasc Surg.* 2012;55(1); 281–285.

SVS Society for Vascular Surgery

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