Peripheral artery disease (PAD) is a common, debilitating, and growing public health problem that is increasing in prevalence due to an aging population and rising rates of diabetes mellitus and obesity.\(^1\) Contemporary data suggest that PAD is present in up to 20% of individuals in the United States who are aged 80 years and older and may be twice as common among African Americans.\(^1\) Critical limb ischemia (CLI) represents the most severe form of chronic PAD, characterized by ischemic rest pain or tissue loss. CLI affects 5% to 15% of the PAD population and is associated with substantial morbidity due to pain, refractory foot ulcers, limb loss, high rates of cardiovascular events and mortality, decreased quality of life, and considerable health care costs.\(^6\)-\(^12\) Patients with CLI have a 3-year rate of limb loss of nearly 40%.

There is a high regional variability in the care of CLI patients, and a higher intensity of coordinated care has been shown to result in better limb outcomes.\(^13\)-\(^15\) Goodney et al evaluated administrative data sets from more than 20,000 PAD patients who had a major leg amputation and found that less than half had undergone vascular evaluation in the year prior to limb loss, and only 17% had either surgical or endovascular intervention to improve ischemia.\(^13\) Geographically, the rate of vascular intervention varied from 33% to 58%,\(^13\) with disparities between physicians and across geographic regions with regard to patterns of care, resource utilization, and outcomes.\(^13\)-\(^15\) Furthermore, racial disparities in care have been recognized.\(^16\) Mustapha et al analyzed the Healthcare Cost and Utilization Project national inpatient database PAD treatment data for 143,993 Caucasians, 34,612 African Americans, and 15,277 Hispanics. Notably, African Americans and Hispanics were more likely to be treated in the emergency department, suggesting late access to PAD therapies, with substantially higher rates of amputation and PAD mortality.\(^16\) Medicare data over the last 15 years have shown declining rates of major and minor amputation concurrent with the broader utilization of revascularization strategies.\(^17\) Nonetheless, recent data have fueled skepticism regarding the impact of revascularization in at least some patient populations. An analysis of 10,784 skilled nursing facility residents undergoing lower extremity vascular procedures essentially found no benefit with regard

**Comparative Metrics for Performance**

- **Mandated pharmacotherapy goal**
  - Statin use rate
  - Antiplatelet use
  - Smoking cessation rates
  - HbA1c targets

- **Clinical (anatomically risk adjusted)**
  - Wound healing rate (trajectory, complete healing)
  - Major amputation
  - Change in anatomic score
  - Chronic total occlusion crossing success rate
  - Clinically driven reintervention
  - Duplex or angiographic restenosis

- **Patient reported**
  - Improvement in pain scores
  - Quality of life (activities of daily life)
  - Time to ambulation

- **Administrative**
  - Length of stay
  - Readmissions
  - Costs
to ambulatory ability or daily function, with overall mortality rates only impacted by the initial ambulatory status. Mortality, despite revascularization, in this elderly cohort was nearly 50% at 1 year. These data suggest that despite improving treatment options, greater awareness among caregivers, and a growing cadre of well-trained specialists, there remain significant challenges to further improving the outcomes of patients with CLI.

THE VIVA VASCULAR LEADERS FORUM
To further examine this issue, Vascular InterVentional Advances (VIVA) Physicians convened the Vascular Leaders Forum (VLF), a multidisciplinary gathering of experts and thought leaders in CLI care. Participants in the VLF represented practitioners from all specialties involved in treating patients with CLI, as well as industry leaders and representatives from United States regulatory and reimbursement agencies. Discussions were centered on paradigms to enhance care, measure and optimize quality, and increase transparency. A central premise to the forum was the concept of multidisciplinary CLI teams responsible for the full cycle of CLI care and providing value-based pathways that could integrate emerging knowledge and informatics into clinical services. Ideally, coordinated CLI care would not only apply to the acute care setting but also extend to the full continuum of care, including skilled nursing facilities, behavioral health, home care, and social and support services. In the future, this may entail unique analytic approaches to coordinate and evaluate algorithmic, programmed, and routed approaches to high-risk or complex care, chronic disease management, and preventive services in the CLI population. Technologies such as wearable feedback monitors, social networks, and virtual support services have the capability to eventually change the way that patients with CLI and other complex illnesses are managed.

THE ROLES OF PHYSICIANS AND SYSTEMS
The concept of CLI teams recognizes that individual physicians may not in every instance possess all the required skills for optimal patient management and that best outcomes may be achieved by the open and early inclusion of care providers with unique and added abilities. In support of this goal, the VLF represented a unique collaboration of multidisciplinary stakeholders in treating CLI, including physicians from broad specialties, industry leaders, and regulatory representatives.

Similarly, the VLF recognized the integral need for acute care institutional support to improve CLI care. Pursuant to this discussion, the group developed guidance for potential comparable metrics and core competencies for CLI teams, as well as possible quality measures for CLI centers of excellence (see the Comparative Metrics for Performance and Core Competencies sidebars). This guidance represents a consensus opinion encompassing both fundamental and more comprehensive evaluation metrics. Each component of the VLF CLI team competencies is specifically measurable, and collectively, these comprise the foundation for a cumulative and graded assessment of team performance.

### CORE COMPETENCIES

**Vascular diagnostics**
- Ultrasound, cross-sectional imaging, perfusion assessment

**Vascular screening program**
- Possibly podiatry based

**Wound care expertise**
- Wound care supplies (including negative pressure dressings)
- Debridement capability
- Skin grafting capabilities
- Infectious disease management
- Wound monitoring capability

**Surgical and revascularization capability**
- Amputation skill set (minor and major)
- Plastic and reconstructive surgery
- Surgical revascularization expertise
- Endovascular therapy expertise

**Ancillary services**
- Rehabilitation and physiatrists
- Endocrinology consultative capacity
- Nephrology consultative capacity
- Neuropathy expertise
- Podiatric/orthopedic support for correction of foot deformities
- Dietary evaluation

**Hospital and leadership support**
- Clinical coordinators and extenders
- Information technology systems (ie, clinical database)
- Outcomes reporting methodology (indicators, success, process)
- Accountability: quality assurance and peer review program to evaluate and remediate operators and teams
CONCLUSION

CLI is a tremendously complex and heterogeneous disease state. The VLF signifies an effort to better define key components of CLI teams. Although the VLF recommendations are not validated and are heuristic models, they constitute a commitment to multidisciplinary care both as a foundational principle and to define the minimal absolute requisites for the development of CLI centers of excellence.

Financial modelling will be an increasingly important topic and a potential future focus for CLI activities. Data have shown that the incidence of ischemic amputation is high and results in major illness and health economic costs. Markov modelling has shown that the total 10-year costs of revascularization—either endovascular or surgical—are lower than the costs of either local wound care alone or primary amputation. Revascularization strategies also produce more health benefits, as measured in terms of years of ambulatory ability, years of limb salvage, or quality-adjusted life-years, regardless of initial health status. Future VLF meetings will further explore these considerations as well as address other issues relevant to CLI or PAD practice.

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