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1. EXECUTIVE SUMMARY—2016 IN REVIEW

During the past year, VQI added 57 new centers and as of June 30, 2016 comprises 387 centers, over 3,000 physicians, and 306,000 procedures in its 12 quality improvement registries. In addition to its continued growth, VQI expanded its activities in many areas, including:

VQI ANNUAL MEETING. VQI members gathered in June for an inaugural Annual Meeting in conjunction with SVS VAM, which offered guidance from QI experts and a QI Project Guide, while showcasing successful QI projects from individual centers. Meanwhile, the 17 VQI Regional Quality Groups continued to hold Spring and Fall Meetings where members analyze variation across centers to identify best practices and opportunities for quality improvement projects.

VQI PARTICIPATION AWARD. An award was instituted this year to recognize VQI member centers for excellence in one-year follow up reporting, Regional Quality Group meeting participation and multiple registry enrollment. Of eligible centers, 58% received 1, 2 or 3 “Stars” based on their level of participation, as listed on the VQI website.

QUALITY IMPROVEMENT REPORTS. The SVS PSO distributed 4 Center-level and 7 Physician-level quality reports this year, which identified specific opportunities for improvement related to reducing length of stay, infection, stroke and hematoma rate, and improving smoking cessation, medical management and appropriate patient selection.

NATIONAL RESEARCH PROJECTS. This year the SVS PSO Research Advisory Committee (RAC) approved 43 projects using de-identified national data submitted by 36 unique VQI investigators from 22 centers, representing diverse topics across multiple procedures. In addition, multiple projects using regional group data were performed at VQI sites.

VASCULAR MEDICINE REGISTRY. In collaboration with the Society for Vascular Medicine, VQI is developing a new registry to evaluate the treatment and outcomes of patients with carotid, abdominal aortic aneurysm (AAA) and lower extremity arterial disease who are managed medically. This Registry will launch in 2017, allowing comparison with interventional and surgical treatment of similar patients.

HOSPITAL COST DATA. A pilot project in collaboration with MedAssets was conducted with 18 VQI hospitals that contributed their charge data for 700 endovascular aneurysm repair (EVAR) procedures done in 2014. Charges were converted to costs and matched with VQI clinical data to create homogeneous patient and procedure groups to allow accurate comparison of total costs and cost categories between hospitals. This project demonstrated the usefulness and feasibility of combining detailed clinical data with hospital billing data to identify opportunities for cost saving in various categories.
Figure 2.1: SVS PSO Organization Structure

Table 2.1: VQI Endorsing Societies

<table>
<thead>
<tr>
<th>VQI Endorsing Societies</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Venous Forum*</td>
</tr>
<tr>
<td>Canadian Society for Vascular Surgery</td>
</tr>
<tr>
<td>Eastern Vascular Society</td>
</tr>
<tr>
<td>Florida Vascular Society</td>
</tr>
<tr>
<td>Georgia Vascular Society</td>
</tr>
<tr>
<td>Michigan Vascular Society</td>
</tr>
<tr>
<td>Midwestern Vascular Surgical Society</td>
</tr>
<tr>
<td>New England Society for Vascular Surgery</td>
</tr>
<tr>
<td>New York Society for Vascular Surgery</td>
</tr>
<tr>
<td>Peripheral Vascular Surgery</td>
</tr>
<tr>
<td>Rocky Mountain Vascular Society</td>
</tr>
<tr>
<td>Society for Clinical Vascular Surgery</td>
</tr>
<tr>
<td>Society for Vascular Medicine*</td>
</tr>
<tr>
<td>Society of Interventional Radiology*</td>
</tr>
<tr>
<td>Southern Association for Vascular Surgery</td>
</tr>
<tr>
<td>Southern California Vascular Surgical Society</td>
</tr>
<tr>
<td>Western Vascular Society</td>
</tr>
</tbody>
</table>

*Members of SVS PSO Governing Council

Table 2.2: SVS PSO Staff

<table>
<thead>
<tr>
<th>SVS PSO Management Staff</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>James Wadzinski</td>
<td>General Manager</td>
</tr>
<tr>
<td>Jack Cronenwett</td>
<td>Medical Director</td>
</tr>
<tr>
<td>Carrie Bosela</td>
<td>Administrative Director</td>
</tr>
<tr>
<td>Nadine Caputo</td>
<td>Quality Director</td>
</tr>
<tr>
<td>Dan Neal</td>
<td>Analytics Director</td>
</tr>
<tr>
<td>Yuanyuan Zhao</td>
<td>Statistician</td>
</tr>
<tr>
<td>Megan Mathy</td>
<td>Program Specialist</td>
</tr>
</tbody>
</table>

Figure 2.2: Breakdown of VQI Physician Committee Participation (Total Committee Members = 310)

*Governing, Exec, and Communications 15%*  
*PSO Arterial/Venous 10%*  
*Regional Groups 15%*  
*Individual Registries 17%*  
*PSO Projects 27%*  
*Industry 8%*

Figure 2.3: VQI Regional Group Map
2. INTRODUCTION

The Vascular Quality Initiative® (VQI®) is a collaboration of the Society for Vascular Surgery Patient Safety Organization (SVS PSO), 17 regional quality improvement groups organized under the SVS PSO, and M2S, its commercial technology partner, each of which is described below. The mission of VQI is to improve the quality, safety, effectiveness and cost of vascular healthcare. The VQI combines the power of the SVS PSO national database with regional opportunities for improvement in a shared learning environment. The SVS PSO provides benchmark reports to hospitals and physicians that anonymously compare their practices and outcomes with others to highlight opportunities for improvement.

A. SOCIETY FOR VASCULAR SOCIETY PATIENT SAFETY ORGANIZATION (SVS PSO)

The Patient Safety and Quality Improvement Act of 2005 authorized the creation of Patient Safety Organizations (PSOs) to improve the quality and safety of healthcare by the collection and analysis of patient data. It protects any comparative outcome analyses or other aggregated reports that is generated by a PSO from discovery in state and federal court. These analyses and reports, called Patient Safety Work Products (PSWP) can be used for quality improvement but not for disciplinary action against a provider. It allows patient identifiers to be collected, without specific IRB or patient approval. This permits a PSO to match patients with other data sources, such as the Social Security Death Index or Medicare claims data to evaluate long-term effectiveness of procedures in terms of mortality or complications. The identity of patients, hospitals and providers cannot be disclosed by a PSO, although non-identifiable data can be published for quality improvement research, adhering to both PSO and HIPAA requirements. VQI embraced the use of a PSO to house its activities, because it provides substantially more security and protection than most registries.

The SVS PSO was approved in February, 2011 to oversee the data sharing partnerships and patient safety initiatives of the VQI. It is directed by a Governing Council of representatives of the SVS and the regional quality groups, and has a robust council and committee structure focused on quality improvement (Figure 2.1) and Appendix B). There are also 17 medical societies which endorse the VQI (Table 2.1), including three who have representation on the SVS PSO Governing Council (Appendix A).

The SVS PSO is an LLC of the Society for Vascular Surgery, with headquarters in Chicago, IL. The SVS PSO governs all functions of VQI, including the specification of data elements captured in each registry, the types of standard reports made available to regional groups, member hospitals and physicians, and national quality improvement projects sponsored by VQI. The SVS PSO staff (TABLE 2.2) provides medical expertise, statistical analyses, and oversight of quality improvement and quality research activities conducted through the PSO.

The SVS PSO is supported by many VQI physicians who volunteer their time to staff key councils and committees essential to the on-going development of the VQI. There are 310 roles across 25 committees and councils, currently staffed by 170 physicians across the country. These include the Governing, Executive and Vascular Technology Councils, 13 Registry Committees, 17 Regional Quality Groups, Arterial and Vascular Quality Committees, six Project Committees, a Communications Committee and a Research Quality Committee (See Figure 2.2).

The SVS PSO is funded by annual membership fees from participating hospitals or physician groups, proportional to the number of registries to which they subscribe. Additional contributions for VQI projects have been obtained from corporate supporters.

B. REGIONAL QUALITY GROUPS

While a uniform database is critical for data collection across all VQI centers, the SVS PSO believes that smaller, regional group meetings to discuss quality improvement foster a sense of ownership, individual responsibility, cooperation, and trust. It is in these meetings where shared data are discussed and regional quality improvement projects are initiated. In fact, VQI is based on the initial experience of the Vascular Study Group of New England, which began collecting data and holding semi-annual meetings in 2003, in Maine, New Hampshire and Vermont. The core principles of anonymous data sharing, benchmarking, discussion of regional variation in process and outcomes were developed by this group, and have now been replicated by 16 regional quality groups organized across the United States (FIGURE 2.3). Regional Quality Groups holds semi-annual meetings of physicians, nurses, researchers, and administrators to discuss regional variations in patient selection, procedure selection, and outcomes, in order to develop regional quality improvement projects.
C. M2S PATHWAYS

The SVS PSO has an exclusive contract with M2S (Lebanon, NH) to provide technology and administrative services. M2S PATHWAYS provides the web-based user interface through which data managers, nurses and physicians enter data into VQI and then receive reports. It allows real-time, user customized reports to be created, but also provides standard anonymous benchmark reports that users can download. M2S also provides a mechanism for users to upload available data directly from the EMR system, and is actively partnering with EMR vendors to expand this functionality, especially since its acquisition by Medstreaming, a leading provider of workflow solutions for vascular EMR systems. Finally, M2S has created a Qualified Clinical Data Reporting (QCDR) system for VQI, which allows participating physicians to use already-entered data to be submitted by M2S to meet CMS PQRS reporting requirements. For more information on M2S, please visit www.VQI.org.

3. VQI DEVELOPMENTS AND ACHIEVEMENTS DURING THE PAST YEAR

Many projects and new developments were accomplished in the Vascular Quality Initiative from July, 2015 through June, 2016, as outlined in detail in this Annual Report.

MEMBER COMMUNICATIONS

- Inaugural VQI Annual Meeting to share best practice and registry tools
- QI Project Guide for members to provide guidance on site-level QI projects
- Regional Quality Group web sites to assist regional groups with regular communication
- Distribution of successful QI case studies from VQI centers
- Expansion of SVS PSO structure with new committees, and expansion of PSO staff to support growth
- Data Manager national and regional meetings and quarterly calls to share registry data processes and analytics

VQI REGISTRY EXPANSION

- Enhanced Peripheral Vascular Intervention (PVI) Registry to include more clinical detail and identification of specific medical devices
- Allowed VQI members to use Carotid Stent Registry to participate in CREST-2 Registry to compare outcomes between Carotid Revascularization Endarterectomy and Stenting Trial
- Vascular Medicine Registry being developed to collect data on peripheral artery disease through a collaboration between the SVS PSO and the Society for Vascular Medicine (SVM)

NATIONAL QI PROJECTS

- Appropriateness of care project targeting optimal selection of asymptomatic patients for carotid endarterectomy
- Increasing smoking cessation after arterial procedures
- Reduced length of stay initiative for endovascular AAA, infrainguinal bypass, and carotid endarterectomy
- Prescribing optimal statin and antiplatelet medications at discharge after arterial procedures

REGIONAL QI PROJECTS

- Use of Ultrasound guidance for peripheral interventions
- Increased recording of hemodynamic data (ABI/TBI) prior to peripheral intervention
- Measuring aneurysm sac diameter one year following EVAR and TEVAR
- Renal Protection from contrast administration during peripheral interventions

VQI REPORTING AND ANALYTICS

- Developed center and physician quality improvement reports
- Created new download capability for reporting for health systems to better compare individual hospitals with the system for VQI
- Ability to “drill down” from aggregated patient cohorts to individual patient-level data
INTEGRATION OF VQI PROCEDURE DATA WITH THIRD PARTY DATA

- Implemented EMR integration by 3rd party integrator to reduce data entry requirements
- Hospital cost data integration pilot with MedAssets for EVAR

NATIONAL AND REGIONAL QUALITY RESEARCH

- Expansion of Quality Research Projects by 82
- Publication of VQI project findings for 10 national and regional projects
- Presentation of VQI project findings for 20 national and regional projects

INDUSTRY COLLABORATION

- Completion of enrolment of patients in the FDA-Gore-Medtronic five-year project to evaluate new TEVAR devices for treatment of aortic dissection. Enrollment still open for one-year study.
- Initiation of projects using VQI data to expand existing device indications
- Initiating a VQI Corporate Roundtable with SVS PSO leaders and industry supporters
- Participation in the International Consortium of Vascular Registries (ICVR)
- Participation in the Medical Device Epidemiology Network Registry Assessment of Peripheral Interventional Devices (RAPID) project
- Publication of VQI quarterly e-newsletters for industry

4. THE VQI REGISTRIES

VQI uses registries as a tool for vascular quality improvement, so it targets the most frequently performed vascular procedures, including both open surgical and endovascular procedures. It focuses on common vascular procedures performed for uniform indications so that they can be fairly compared across institutions and physicians. In addition to granular clinical data obtained at the time of initial treatment, VQI requires data on patient status and treatment outcomes after one-year which is obtained when patients return for follow-up.

The SVS PSO conducts routine and targeted statistical audits, to ensure complete and accurate data within the VQI registries. VQI centers are required to submit claims data which are audited within the SVS PSO to identify any procedures that were billed but not submitted. Any missing cases must then be entered so that consecutive case entry is assured. In order to audit data accuracy, important outcome events that might be under-reported are selected for statistically-based chart audits. Multivariable models are created to identify cases at high risk for a potential complication, but where no complication was reported. These cases are then audited by an independent observer at each site, and any data errors are corrected. This method has much greater likelihood of detecting important data errors than random chart audit.

As of June 2016, there were 12 VQI registries that contained 306,000 vascular procedures, as shown in Table 4.1. During the past year (July 2015 through June 2016), there were nearly 84,000 procedures added to the registries, as shown.

During the past year, the SVS PSO welcomed the collaboration of the Society for Vascular Medicine (SVM) in a joint registry committee to develop a new Vascular Medicine Registry which will launch in 2017. This registry will evaluate the treatment and outcomes of patients with carotid, abdominal aortic aneurysm and lower extremity arterial disease who are managed medically. It will allow comparison with interventional and surgical treatment registries in VQI, and as such, will form a complete disease-based, rather than procedure-based focus in VQI. The Vascular Medicine Registry will be endorsed by the SVM for its members.

Table 4.1 – VQI Registries and Procedure Volumes (as of June 30, 2016)

<table>
<thead>
<tr>
<th>Procedures</th>
<th>Total Procedures July 2015 - June 2016</th>
<th>Total Procedures All Years</th>
<th>Growth</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peripheral Vascular Intervention</td>
<td>27,063</td>
<td>96,618</td>
<td>39%</td>
</tr>
<tr>
<td>Carotid Endarterectomy</td>
<td>16,862</td>
<td>69,624</td>
<td>32%</td>
</tr>
<tr>
<td>Intra-Inginal Bypass</td>
<td>5,905</td>
<td>31,942</td>
<td>28%</td>
</tr>
<tr>
<td>Endovascular AAA Repair</td>
<td>6,808</td>
<td>27,911</td>
<td>32%</td>
</tr>
<tr>
<td>Hemodialysis Access</td>
<td>7,639</td>
<td>26,210</td>
<td>41%</td>
</tr>
<tr>
<td>Carotid Artery Stent</td>
<td>3,233</td>
<td>11,499</td>
<td>39%</td>
</tr>
<tr>
<td>Supra-Inginal Bypass</td>
<td>2,559</td>
<td>10,709</td>
<td>31%</td>
</tr>
<tr>
<td>Open AAA Repair</td>
<td>1,418</td>
<td>8,431</td>
<td>20%</td>
</tr>
<tr>
<td>Thoracic and Complex EVAR</td>
<td>2,246</td>
<td>6,646</td>
<td>51%</td>
</tr>
<tr>
<td>IVC Filter</td>
<td>2,486</td>
<td>5,714</td>
<td>77%</td>
</tr>
<tr>
<td>Lower Extremity Amputations</td>
<td>2,304</td>
<td>5,550</td>
<td>71%</td>
</tr>
<tr>
<td>Varicose Vein</td>
<td>4,043</td>
<td>5,574</td>
<td>32%</td>
</tr>
<tr>
<td>Total Procedures Captured</td>
<td>83,069</td>
<td>305,030</td>
<td>39%</td>
</tr>
</tbody>
</table>

Source: M2S PATHWAYS data, June 2016
5. VQI MEMBERS

VQI participation is voluntary. Any physician or center that performs vascular care monitored by VQI is eligible to participate. Since its launch in 2011, VQI has rapidly grown from then 60 centers that were participating in 3 non-connected regional groups to 387 current centers as of June 30, 2016 (Figure 5.1), which comprise hospitals, physician groups and ambulatory treatment centers. During the past year, 57 new centers joined VQI (See Appendix A for full listing of VQI participating sites). There continues to be broad interest across all types of hospitals, with an even distribution of academic, teaching-affiliated and community hospitals (Figure 5.2).

Although VQI began as a vascular surgery initiative focused on open surgical procedures, it rapidly grew to encompass endovascular procedures. With that expansion, a large number of radiologists and cardiologists who perform vascular treatment joined VQI (Figure 5.3).

VQI centers are well distributed nationally, with locations in 46 states. In addition, there are now three VQI sites in Ontario (Figure 5.4).

Figure 5.1: Number of VQI Centers, October 2009 – June 2016

Figure 5.2: VQI Participating Hospital Types (%)

Figure 5.3: Specialty of Physicians in All VQI Registries

Figure 5.4: Location of Current VQI Sites
6. QUALITY IMPROVEMENT METHODS IN VQI

A central tenet of VQI is that analysis of the natural variation in patient selection, process of care and outcome can identify best practices as well as opportunities for improvement. Discussion of variation across centers in regional quality group meetings encourages initiatives to reduce variation and improve quality. In fact, at its core, the value of VQI for participating hospitals and physicians is to provide them with data not otherwise available that allows them to accurately compare their performance with others. This information, when trusted by the users, can produce improvements in patient care much more quickly than the adoption of evidence even from the scientific literature. VQI has built a trusted and reliable source of detailed vascular care data that stimulate practice change in a supportive peer environment. The Regional Quality Groups are provided with straightforward quality improvement tools that encourage local accountability for improvement, enhanced by members’ intrinsic motivation to provide the best care (Figure 6.1).

As an example, a VQI quality improvement project found substantial variation in surgical site infection (SSI) across centers after lower extremity bypass surgery. A multivariate analysis indicated that pre-operative skin cleansing with chlorhexidine (as opposed to an iodine-based solution) substantially reduced SSI rates. As a result of these findings, specific Center Opportunity Profiles for Improvement (COPI) Reports were distributed to each VQI center illustrating their opportunity to reduce SSI with specific interventions. Within two months of this COPI Report, the use of chlorhexidine across VQI centers rapidly increased (Figure 6.2) and in those centers that switched to chlorhexidine, the SSI rate substantially decreased (Figure 6.3).
Thus, analysis of variation across VQI centers and regions leads to the identification of targets for quality improvement that are distributed to centers as COPI Reports, and to physicians as reports that focus on their specific performance (see Appendix E for examples). In addition, multiple reports are prepared for each semi-annual regional quality group meeting that compares each Regional Group, and provides additional data for new quality improvement projects. These reports target not only processes of care, but also patient selection, outcomes and economic factors such as length of stay (see Appendix E for a list of all reports). These Regional Quality Group reports provide the basis for discussion, further quality research, and regional QI projects.

The SVS PSO has established a process, outlined in Figure 6.4, which uses both VQI data from the M2S PATHWAYS platform as well as SVS PSO analytics to identify best practice. (See Appendix G for Clinical Registry Data Tables.)

Beyond reports, VQI has worked with quality improvement (QI) experts to develop a QI Project Guide that walks members through a typical QI project, from initial planning and methodology through to evaluation, using real VQI case study examples. This year, VQI also launched its Inaugural Annual Meeting, VQI @ VAM, to provide VQI members with education about the VQI Registries and QI skills necessary to leverage the maximum potential of VQI data.

The 2016 VQI Annual Meeting was attended by nearly 200 physicians, data managers and quality professionals. The meeting offered a full day of education content on a wide range of topics geared to help hospitals leverage the clinical registry data from the VQI to initiate quality improvement projects. Specific education was offered to data managers in an effort to help them better understand the importance of key clinical variables in each of the VQI Registries. Scenario-based training was also offered as a means to address complex clinic scenarios a data manager may encounter in their day-to-day work with the registries. Attendees then heard from nationally recognized quality improvement experts on how registry data can be used in structured quality improvement processes. Finally, VQI members presented cases studies on how they used VQI data to improve patient care in their hospitals. The sharing of best practices amongst VQI members is a key component in helping others act upon registry data, to improve vascular care on behalf of the patient. Due to the success of the 2016 meeting, the 2017 VQI Annual Meeting will expand to add additional time and educational offerings for its members.

Figure 6.4: Approach for Improving Outcomes

Driving Better Outcomes

- Collect and analyze variation with the M2S PATHWAYS™ Platform
  - Center-level and physician-level variation
  - Drill down capability
  - Real-time reporting

- Identify opportunities to improve through SVS PSO benchmarking
  - Research-based quality initiatives
  - National and regional comparisons
  - Comprehensive quality improvement mechanism

- Collaborate through Regional Quality Groups to make change
  - Understand local variation
  - Develop quality plans
  - Track improvement over time
  - Develop enhancements for quality and safety

Sample Variation Reporting

COPI Reports by VQI Center

Regional Quality Reporting

Source: VQI
7. QUALITY IMPROVEMENT PROJECTS IN VQI

OPTIMIZING DISCHARGE MEDICATIONS. VQI data have shown that patients undergoing arterial treatment who received discharge prescription of antiplatelet medications and a statin had > 20% improvement in absolute 5-year survival. Physician-specific reports provided VQI members with data on their individual prescribing rates for discharge medications and how they compared to their peers. VQI disseminated evidence-based information and tools for providers and patients, such as templated communications to primary care physicians, to increase the number of patients receiving optimal medications and improve their vascular health.

REDUCING LENGTH OF STAY. VQI data have been instrumental in helping centers reduce LOS for major vascular procedures. Reducing patient length of stay (LOS) is important because it reduces the risk of hospital acquired infections and it frees up needed resources for hospital providers. Several Regional Quality Groups reduced LOS for major vascular procedures such as infra-inguinal bypass and carotid endarterectomy (CEA). Hospitals analyzed VQI data, identified potential causes and brainstormed solutions. In their regional groups and at our annual VQI meeting, members shared success factors that contributed to decreased LOS such as discharging patients directly from the ICU, adjusting the time of surgery, encouraging earlier patient mobility and providing patients with more information about discharge expectations during pre-surgical visits. Some hospitals saw increased rates of patient satisfaction and others realized cost savings.

IMPROVING SMOKING CESSATION. VQI data show substantial variation across centers in the rate of patient smoking cessation one year after arterial procedures. A project by 8 VQI centers found that effective nicotine replacement and quit-line referral increased significantly at sites instructed in proper technique. A national QI effort with feedback to centers and physicians about their use of effective smoking cessation techniques is being launched in this important area.

IMPROVING PATIENT SELECTION FOR TREATMENT. The decision to recommend prophylactic treatment, such as carotid endarterectomy or stenting to prevent stroke in asymptomatic patients, requires a careful analysis of the risks and benefits of the procedure. Such patients need to have sufficient survival for the benefit of long-term stroke reduction to offset the upfront stroke risk of treatment. VQI has prepared reports regarding predicted and actual asymptomatic patient survival after carotid treatment, which allow physicians and centers to compare themselves anonymously with others. Similar reports have been created for prophylactic treatment of patients with mild lower extremity arterial disease, and are expected to drive outlier practice toward the mean.

REGIONAL QI PROJECTS. In addition to national VQI projects, each Regional Quality Group organizes QI projects based on their own interests. Current examples of include the use of ultrasound guidance to reduce access site complications during peripheral arterial interventions, accurate monitoring of aneurysm diameter changes after endovascular treatment, physiologic evaluation of leg circulation prior to treatment, and methods to avoid kidney injury by contrast agents used during peripheral intervention.

8. RESEARCH AND QUALITY IMPROVEMENT

VQI members can submit requests for non-identifiable national or regional registry datasets for research and quality improvement projects that must be approved by the SVS PSO or their regional group Research Advisory Committee. These data do not identify patients, centers or providers, but provide a rich source to analyze real world practice and variation in process and outcomes. Data requests are reviewed to be sure that they are scientifically valid, that they are consistent with the VQI mission, and that they do not overlap with existing projects. Importantly, research projects often lead directly to QI projects. For example, a research study was conducted to determine factors associated with re-operation for bleeding after carotid endarterectomy, a rare but serious complication (Ref: J Vasc Surg. 2010 Mar;51(3):559-64). It was found that administration of the drug protamine to reverse the anticoagulant effect of heparin used during the procedure significantly reduced reoperation for bleeding. This report at regional and national meetings led to rapid practice change, substantially reducing the rate of this complication. (J Vasc Surg. 2013 Dec;58(6): 1518-1524).

Since its inception in 2011, VQI projects have resulted in 56 published scientific articles in journals including the Journal of Vascular Surgery, Annals of Vascular Surgery, Journal of American College of Surgery, and Circulation: Cardiovascular Interventions. VQI data have also been used as the basis for 91 presentations at national and regional society meetings.
From July 2015 through June 2016, the SVS PSO has approved 43 new proposals for national research from 36 unique VQI investigators in 22 centers, representing diverse topics across multiple procedures (for full list of VQI Quality Research Proposals, please see www.VQI.org for most recent list of proposals). Progress of projects is tracked by the SVS PSO and investigators with similar projects are encouraged to collaborate Regional groups have published six papers, seven presentations and a further 39 regional proposals since July 2015 have been accepted in addition to the national projects.

9. PARTNERSHIP WITH INDUSTRY

High quality medical devices and drug therapies are an important component of vascular healthcare. VQI is able to provide the flexibility and granularity of data to support post-approval surveillance and improve patient safety through real-world examination of devices and therapies. For this reason, VQI has partnered with device manufacturers, the FDA and VQI member centers to evaluate medical devices used for vascular treatment. These data offer device and drug manufacturers an efficient method to meet regulatory requirements, expand existing labeling and aid in the design of new products and provides evidence-based information to help guide physicians in their selection of devices.

POST-APPROVAL SURVEILLANCE PROJECTS. The use of VQI data for post-approval surveillance is consistent with the FDA vision to use more real-world registry data. Initial projects have demonstrated that both administrative resources as well as time required for patient recruitment is significantly reduced by leveraging the existing network of VQI sites. This is best evidenced by the early completion of 400 procedures in the Thoracic Aortic Dissection (TEVAR) Project, which was completed in half the time initially estimated by the industry sponsors Medtronic and WL Gore.

These projects are consistent with the SVS PSO mission regarding patient safety and ensure the collection of all procedures, rather than just those involving patients who give informed consent in a more standard, non-PSO based project.

EXPANSION OF DEVICE INDICATIONS. Many more devices used to treat vascular disease have been adapted to expanded indications than those originally approved by the FDA. Data about such “off-label” use is captured in VQI and offers the potential to provide FDA, industry and physicians with important information to better match patients with devices for optimal treatment. The FDA has indicated that such data could be used to support expansion of indications for use applications. Several industry projects are currently underway in this area which may combine both historic and prospective VQI data.

OBJECTIVE PERFORMANCE DATA. Regulatory approval of new devices often requires comparison with the contemporary performance of existing techniques and devices. Such data are being collected in the “real world” of VQI across multiple physician specialties and hospital types. However, historical data may not always contain some details of device type or treatment that might be needed for a device evaluation project. This year VQI demonstrated the ability to supplement already collected procedure and one-year follow-up data with new data added by sites that had performed these procedures. This provided the objective performance data, including already existing one-year follow-up, within five months, as opposed to a new prospective project over several years.

A. CURRENT INDUSTRY PROJECTS

VQI has partnered with several device manufacturers to provide aggregate data for product development, creation of objective performance standards, and expansion of device indications. In addition, VQI is hosting several prospective data collection projects including:

CREST-2 REGISTRY. In collaboration with the CREST-2 Randomized Control Trial (RCT), M2S prepares reports of VQI carotid artery stent (CAS) data so that VQI participants can potentially qualify for the CAS volume and quality standards required for CREST-2 participation. To date, 76 VQI Members have entered over 1,000 cases in the CAS Registry to satisfy their CREST-2 Registry requirements.

ANGULATED AORTIC NECK EVAR SURVEILLANCE PROJECT. This FDA-required post-approval surveillance project monitors the outcome of EVAR treatment of abdominal aortic aneurysms with highly angulated necks with the Aorfix device manufactured by Lombard Medical. The project will enroll 234 patients with five-year follow-up including core lab CT scan imaging provided by M2S.
TEVAR TYPE B AORTIC DISSECTION SURVEILLANCE PROJECT.
This FDA required post-approval surveillance project monitors the outcome of descending aortic dissection treatment with the recently approved TEVAR devices manufactured by Gore and Medtronic. Recruitment of patients with 200 acute and 200 chronic dissections has completed, and five-year follow-up is underway. In addition, an additional 200 patients will be monitored with one-year follow-up.

**B. PSO CORPORATE SUPPORT**
The operations of the SVS PSO are financed by fees paid by participating sites. New project development, including addition of new registries, quality reports, and improved functionality in VQI has been made possible through generous unrestricted contributions by Quality Champion and Quality Partner corporations. Representatives of these companies participate in the SVS PSO Technology Council’s quarterly Corporate Roundtable meetings in order to provide advice about optimal quality assessment of vascular devices in the SVS PSO. Corporate sponsors of the SVS PSO for the past year are listed at right.

**10. NEW VQI PROJECTS**

**EMR INTEGRATION TO REDUCE DATA ENTRY.** VQI continues to encourage companies to integrate VQI data elements into their EMR products to allow one-time data entry during the process of care and eliminate the need for web-based registry data entry. In addition to its standard data import tools, M2S developed partial data integration capability with several EMR vendors, MedStreaming and mTuitive, this year. This mechanism of data transfer allows hospitals to comply with current meaningful use requirements and the planned Advancing Care Information component of the CMS Merit-based Incentive Payment System (MIPS).

**COST DATA INTEGRATION:** A major initiative to address the value of vascular care began this year when the VQI launched the endovascular aneurysm repair (EVAR) cost and quality pilot study with 18 VQI hospitals. The purpose is to assess the usefulness and feasibility of combining detailed clinical data with hospital billing data in an actionable way. This combined data allows hospitals to benchmark their costs and analyze categories of expenditures with the most variation and potential for cost savings, such as operating room, medical/surgical, intensive care unit and device costs.

**CLAIMS DATA INTEGRATION:** In order to evaluate the effectiveness of treatment, long-term follow-up is important. While VQI collects one-year follow-up data, many outcomes such as re-intervention may occur after one-year. VQI has now successfully matched its Medicare patients with their claims data, so that key outcomes can be measured for multiple years after the initial procedure. This information will lead to more accurate analysis of the effectiveness of vascular treatment, and improve patient selection for these procedures.
11. POTENTIAL BENEFITS FROM VQI FOR KEY STAKEHOLDERS

FOR PATIENTS
- Improved in-hospital care based on results of VQI data analyses
- Improved long-term care through granularity of VQI data and emphasis on follow-up reporting
- Faster feedback on the safety and effectiveness of medical devices
- Increased awareness of long term effects of vascular care
- Better understanding of risk factors and how to prevent future vascular events

FOR PHYSICIANS/PROVIDERS
- Enhanced ability to share, compare and benchmark quality outcomes across regions and specialties for education and best practice development
- Better understanding and management of different types of patients through aggregated data
- Better access to actionable data and reports to initiate improvement programs (i.e. surgical site infections, discharge medication)
- More granular data for both quality care and quality research

FOR POLICY-MAKERS
- Ability to identify trends and efficiencies to improve safety and efficacy in current practice (existing devices)
- Work collaboratively with the SVS and members to develop quality measures
- Actionable data for quality improvement on a national scale
- Better data to inform decision making on policy development
- More effective patient tracking for post-approval device surveillance
- Data to inform alternative and bundled payment systems

FOR Payers
- Faster feedback on safety and efficacy for new procedures and devices
- Better data for statistical analysis and decision-making on reimbursement across all procedures
- Comparative data that informs population health approaches including accountable care organizations (ACOs) and Centers of Excellence (COE) programs

FOR INDUSTRY
- Greater savings in post-approval studies through simplified administration
- Easier access to data on specific patient populations within the VQI database
- Faster feedback on safety and efficacy on new devices
- Better ability to identify trends and opportunities for device development
APPENDIX A—387 VQI CENTERS LISTED BY STATE, AS OF JUNE 2016

Providence Alaska Medical Centers (AK)
University of Alabama (AL)
University of Arkansas (AR)
Carondelet Specialists Group (AZ)
Mayo Clinic Arizona (AZ)
The University of Arizona MC—University Campus (AZ)
Cedars-Sinai Medical Center (CA)
Dignity Health (Quoqua Hospital) (CA)
El Camino Hospital (CA)
Hoag Memorial Hospital Presbyterian (CA)
Loma Linda University Medical Center (CA)
Marin General Hospital (CA)
Palio Alto Medical Foundation (CA)
Providence Holy Cross Medical Center (CA)
Providence Little Company of Mary, Torrance (CA)
Providence Saint Joseph Medical Center (CA)
Providence Tarzana Medical Center (CA)
San Fernando Valley Vascular Group (CA)
Scripps Green Hospital (Scripps Health) (CA)
Sharp Chula Vista Medical Center (CA)
Sharp Grossmont Hospital (CA)
Sharp Memorial Hospital (CA)
St. John's Health Center (Providence) (CA)
Stanford Hospital & Clinics (CA)
UC Davis Health System (CA)
UCLA- Harbor MC, Los Angeles County (CA)
UCLA- Ronald Reagan Medical Center (CA)
UCSD Medical Center (CA)
UCSF Medical Center (CA)
USC University Hospital- Keck Hospital (CA)
Washington Hospital Health System (CA)
St. Michael's (CAN)
Thunder Bay Regional Health Sciences Centre (CAN)
Toronto General Hospital (CAN)
Cantura- Penrose St. Francis Health Services (CO)
Centura- Porter Adventist Hospital (CO)
Exempla- Saint Joseph Medical Center (CO)
Presbyterian St. Luke's Medical Center (CO)
UCHA- Memorial Hospital Central (CO)
University of Colorado, Denver (CO)
Danbury Hospital (CT)
Hartford Hospital (CT)
Saint Francis Hospital and Medical Center (CT)
Yale-New Haven Hospital (CT)
MedStar- Washington Hospital Center (DC)
MFA- Med Faculty Assoc Physician Group (DC)
Beebe Healthcare (DE)
Christiana Care Health System (DE)
Baptist Hospital of Miami (FL)
BayCare- St. Anthony’s Hospital (FL)
Coastal Vascular & Interventional, PLLC (FL)
Florida Hospital- Orlando (FL)
Mayo Clinic Florida (FL)
Memorial Hospital Pembroke (FL)
Memorial Hospital West (FL)
Memorial Regional Hospital (FL)
Miami Vein Center (FL)
North Florida Regional Medical Center (FL)
Orlando Health—Dr. P. Phillips Hospital (FL)
Orlando Health—Orlando Regional MC (FL)
Orlando Health—South Seminole Hospital (FL)
Palm Beach Gardens MC (Cleveland Clinic) (FL)
Sarasota Memorial Hospital (FL)
South Miami Hospital (FL)
Tallahassee Memorial Hospital (FL)
Tampa Cardiovascular Associates (FL)
Tampa General Hospital (FL)
The Vein and Vascular Institute of Tampa Bay (FL)
UF Health- Shands Hospital (FL)
Vascular Surgery Associates (FL)
Albany Vascular Specialist Center (GA)
Athens Regional Medical Center (GA)
Emory Healthcare (GA)
Floyd Medical Center (GA)
Grady Memorial Hospital (GA)
Memorial University Health MC—SHV (GA)
Northside Hospital Atlanta (GA)
Northside Hospital Cherokee (GA)
Northside Hospital Forsyth (GA)
Piedmont Hospital Atlanta (GA)
Redmond Regional Medical Center (GA)
Tift Regional Medical Center (GA)
Cardiovascular Medicine PC (IA)
Iowa Heart Center at Mercy Medical Center (IA)
UnityPoint Health—Des Moines (IA)
Cardiovascular Medicine PC (IL)
Carle Foundation Hospital (IL)
Northshore Univ Health—Northshore Skokie Hospital (IL)
Northwestern MC DuPage Hospital (IL)
Northwestern Memorial Hospital (IL)
OSF- Saint Anthony Medical Center (IL)
OSF- Saint Francis Medical Center (IL)
OSF- St. Joseph Medical Center (IL)
SIU School of Medicine, Memorial MC (IL)
St. Mary's Hospital—Decatur (IL)
UnityPoint Health—Methodist (IL)
University of Chicago Medical Center (IL)
Weiss Memorial Hospital (IL)
Beacon Health Clinic (IN)
Community Hospital East (IN)
Community Hospital Heart & Vascular (IN)
Community Hospital South (IN)
IU Health—Arnett Hospital (IN)
IU Health—Ball Memorial Hospital (IN)
IU Health—Bloomington Hospital (IN)
IU Health—Goshen Hospital (IN)
IU Health—Methodist Hospital (IN)
IU Health—Saxony Hospital (IN)
Memorial Hospital of South Bend (IN)
Saint Joseph Regional Medical Center (IN)
St. Francis Heart Center (IN)
St. Vincent Heart Center of Indiana, LLC (IN)
St. Vincent Hospital & Healthcare Center (IN)
University of Kansas Medical Center (KS)
Baptist Health Madisonville- Jack L. Hamman Heart & Vascular Center (KY)
KentuckyOne Health—Jeffrey East (KY)
KentuckyOne Health—Jeffrey Hospital (KY)
King's Daughter's Hospital (KY)
Baton Rouge General Medical Center (LA)
LSU Health Science Center - Shreveport (LA)
Ochsner Medical Center (LA)
Our Lady of the Lake (LA)
Baystate Medical Center (MA)
Berkshire Medical Center (MA)
Beth Israel Deaconess Medical Center (MA)
Boston Medical Center (MA)
Brigham and Women’s Hospital (MA)
Hoenig Vascular Center (MA)
Massachusetts General Hospital (MA)
Southcoast- Charlton Memorial Hospital (MA)
Southcoast— St. Luke’s Hospital (MA)
St. Elizabeth’s Medical Center (MA)
Tufts Medical Center (MA)
University of Massachusetts Mem Hospital (MA)
Vascular Care of Metrowest, P.C. (MA)
Horizon Vascular Specialists (MD)
Johns Hopkins Bayview Medical Center (MD)
Maryland Vascular Specialist (MD)
Mercy Medical Center- Baltimore (MD)
The Johns Hopkins Hospital (MD)
University of Maryland Medical Center (MD)
Central Maine Medical Center (ME)
Eastern Maine Medical Center (ME)
Maine Medical Center (ME)
MaineGeneral Medical Center (ME)
Mercy Hospital (ME)
Beaumont Grosse Point Hospital (MI)
Beaumont Royal Oak Hospital (MI)
Beaumont Troy Hospital (MI)
Borgess Hospital (MI)
DMC Harper University Hospital (MI)
Henry Ford Hospital (MI)
Henry Ford Hospital West Bloomfield (MI)
McLaren Clemens Reg MC d/b/a McLaren Macomb (MI)
McLaren Regional Medical Center d/b/a Flint (MI)
Michigan Vascular Center (MI)
Spectrum Health Hospital (MI)
University of Michigan (MI)
Vascular Center of Northern Michigan (MI)
Allina—Abbott Northwestern Hospital (MN)
Allina—Mercy Hospital (MN)
Allina—United Hospital (MN)
Allina—Unity Hospital (MN)
Fairview—Southdale Hospital (MN)
Fairview—University of Minnesota MC (MN)
Mayo Clinic (MN) (MN)
St. Luke’s Hospital (MN)
Columbia Surgical Services, Inc. (MO)
Mercy Hospital Springfield (MO)
Mercy Hospital St. Louis (MO)
SSM DePaul Health Center (MO)
SSM Health St. Louis Univ. Hosp. (MO)
SSM St. Clare Health Center (MO)
SSM St. Joseph Health Center (MO)
SSM St. Mary’s Health Center (MO)
St. Anthony’s Medical Center (MO)
St. Luke’s Hospital (MO)
University of Missouri Medical Center (MO)
Anderson Regional Medical Center (MS)
The Practice of John D Lucas III, M.D. (MS)
University of Mississippi Medical Center (MS)
St. Patrick Hospital (Providencia) (MT)
St. Vincent Healthcare (MT)
Alamance Regional Medical Center (NC)
Carolina Healthcare—Pineville (NC)
Carolina Healthcare System- Sanger Heart & Vascular Institute (NC)
Cone Health Heart & Vascular Center (NC)
Duke University Medical Center (NC)
Mission Hospital (NC)
Novant Health Forsyth Medical Center (NC)
APPENDIX A—387 VQI CENTERS LISTED BY STATE, AS OF JUNE 2016

Rex Healthcare (UNC Health System) (NC)
University of North Carolina Hospitals (NC)
Vidant Medical Center (NC)
Wake Forest Baptist Health (NC)
Chi Health Nebraska Heart (NE)
Nebraska Medical Center (NE)
Catholic Medical Center d/b/a CTSA (NH)
Concord Hospital (NH)
Dartmouth Hitchcock Medical Center (NH)
Eliot Hospital (NH)
Lakes Region General Hospital (NH)
Cooper University Medical Center (NJ)
Kennedy University Hospital (NJ)
Meridian—Bayshore Community Hospital (NJ)
Meridian—Jersey Shore University MC (NJ)
Meridian—Ocean Medical Center (NJ)
Meridian—Riverview Medical Center (NJ)
Meridian—Southern Ocean Medical Center (NJ)
Monmouth MC (Barnabas Health) (NJ)
Newark Beth Israel MC (Barnabas Health) (NJ)
Overlook Hospital (Atlantic Health System) (NJ)
Saint Barnabas MC (Barnabas Health) (NJ)
Heart Hosp. of New Mexico at Lovelace MC (NM)
Presbyterian Hospital (NM)
Regents of the University of New Mexico (NM)
Carson Tahoe Regional Hospital (NV)
Carson Tahoe Regional Hospital (NV)
Catholic Health Mercy Hospital of Buffalo (NY)
Catholic Health Sister of Charity Hospital (NY)
Columbia University Medical Center (NY)
Kaleida- Buffalo General Hospital (NY)
Maimonides Medical Center (NY)
Montefiore Medical Center (NY)
Mount Sinai—Beth Israel Hospital (NY)
Mount Sinai Hospital (NY)
Mount Sinai—St.Luke’s Roosevelt Hospital Ctr (NY)
NSLU- Lenox Hill Hospital (NY)
NSLU- Long Island Jewish Medical Center (NY)
NSLU- North Shore University Hospital (NY)
NSLU- Staten Island Hospital- North Site (NY)
NYP/Weill Cornell Medical College (NY)
NYU Langone Medical Center (NY)
Stony Brook University Medical Center (NY)
Strong Memi Hosp. of Rochester (NY)
SUNY Upstate—University Hospital MC (NY)
Westchester Medical Center (NY)
Winthrop University Hospital (NY)
Aultman Hospital (OH)
Cleveland Clinic, Heart and Vascular Institute (OH)
Mercy Medical Center (OH)
Mount Carmel—St Ann’s Hosp (OH)
Mount Carmel East Hospital (OH)
Mount Carmel West Hospital (OH)
OhioHealth Doctors Hospital (OH)
OhioHealth Dublin Methodist Hospital (OH)
OhioHealth Grady Memorial Hospital (OH)
OhioHealth Grant Medical Center (OH)
OhioHealth Mansfield Hospital (OH)
OhioHealth Marion General Hospital (OH)
OhioHealth Riverside Methodist Hospital (OH)
ProMedica Toledo Hospital, Jobst Vascular (OH)
Summa Health System (OH)
The MetroHealth System (OH)
The Ohio State University, Wexner MC (OH)
University Hospitals Health System (OH)
University of Toledo Medical Center (OH)
Wright State Physician Group (OH)
Inovia Vein Specialty Center (OR)
Oregon Health & Sciences University (OR)
Providence Medford Medical Center (OR)
Providence Portland Medical Center (OR)
Providence St. Vincent Medical Center (OR)
Abington Memorial Hospital (PA)
DLP Conemaugh Memorial Medical Center (PA)
Geisinger Community Medical Center (PA)
Geisinger Medical Center (PA)
Geisinger Wyoming Valley Medical Center (PA)
Guthrie Clinic (PA)
Penn State Milton S. Hershey Medical Center (PA)
St. Luke’s Hospital—Allentown (PA)
St. Luke’s Hospital—Anderson (PA)
St. Luke’s Hospital & Health Network (PA)
St. Mary Medical Center (PA)
The Reading Hospital and Medical Center (PA)
UPENN—University of Pennsylvania (PA)
UPMC/ UPP Vascular Surgery (PA)
UPMC/hamot Hospital (PA)
West Penn—Allegheny General Hospital (PA)
West Penn—Allegheny Valley Hospital—Kiski MC (PA)
West Penn- Forbes Regional Hospital (PA)
West Penn Hospital (PA)
West Penn- Jefferson Hospital (PA)
Lifespan- Rhode Island Hospital (RI)
Lifespan- The Miriam Hospital (RI)
Beaufort Memorial Hospital (SC)
McLeod Regional Medical Center (SC)
Medical University of South Carolina Hospital (SC)
Palmetto Health Richland (SC)
Regional MC of Orangeburg & Calhoun Co (SC)
Roper St. Francis Hospital (SC)
Self Regional Healthcare (SC)
Spartanburg Regional Health Services—District, Inc. (SC)
Trident Medical Center (SC)
Rapid City Regional Hospital (SD)
Sanford Clinic Vascular Associates (SD)
Baptist Memorial Hospital—Memphis (TN)
Dr E Gardner MD PC (TN)
Jackson Madison County General Hospital (TN)
Nashville Vascular & Vein Institute (TN)
Premier Surgical Associates, PLLC (TN)
Saint Thomas Midtown Hospital (TN)
Saint Thomas Rutherford Hospital (TN)
Saint Thomas West Hospital (TN)
University of Tennessee Medical Center (TN)
Baylor All Saints Medical Center (TX)
Baylor—Jack and Jane Hamilton Heart and Vascular Hospital (TX)
Baylor—The Heart Hospital Denton (TX)
Baylor—The Heart Hospital Plano (TX)
Baylor University Medical Center (TX)
CTVS—Cardiothoracic Vascular Surgeons (TX)
Houston Methodist St. John Hos.— Clear Lake (TX)
John Sealy Hospital, UTMB (TX)
Medical Centre Hospital (TX)
Mmm Herrmann Heart & Vascular Inst.— Texas MC (TX)
Memorial Hermann Southwest Hospital (TX)
Peripheral Vascular Associates (TX)
Scott & White Memorial Hospital (TX)
South Texas Vascular Center (TX)
Texas Health Presbyterian Hospital Dallas (TX)
University of Texas Health Science Center, San Antonio (TX)
University of Texas MD Anderson Center (TX)
University of Utah Hospital and Clinics (UT)
UT Southwestern MC (TX)
Augusta Health (VA)
Carilion Roanoke Memorial Hospital (VA)
Centra Health (Lynchburg General Hospital) (VA)
Charlottesville Radiology LTD & CRL Surgical (VA)
CJW Medical—Chippinham Hospital (VA)
CJW Medical—Johnston-Willis Hospital (VA)
Inova Alexandria Hospital (VA)
Inova Fair Oaks Hospital (VA)
Inova Fairfax Hospital (VA)
Inova Gainsville Hospital (VA)
Inova Loudoun Hospital (VA)
Inova Mount Vernon Hospital (VA)
Mary Washington Hospital (VA)
Sentara Careplex Hospital (VA)
Sentara Leigh Hospital (VA)
Sentara Norfolk General Hospital (VA)
Sentara Northern Virginia (VA)
Sentara Obici Hospital (VA)
Sentara Princess Anne Hospital (VA)
Sentara RMH Medical Center (VA)
Sentara Virginia Beach General Hospital (VA)
Sentara Williamsburg Regional MC (VA)
UVA Medical Center (UVA Health System) (VA)
Virginia Commonwealth University Hospital Authority (VA)
Winchester Medical Center (VA)
Fletcher Allen HealthCare (VT)
Harborview Medical Center (WA)
Kadlec (Providence) (WA)
Northwest Hospital & Medical Center (WA)
Providence Holy Family Hospital (WA)
Providence Regional Medical Center (WA)
Providence Sacred Heart Medical Center (WA)
Providence St. Mary Medical Center (WA)
Providence St. Peter Hospital (WA)
Swedish Cherry Hill (Providence) (WA)
Swedish Edmonds (Providence) (WA)
Swedish First Hill (Providence) (WA)
University of Washington Medical Center (WA)
Virginia Mason (WA)
Aurora Baycare Medical Center (WI)
Aurora Lakeland Medical Center (WI)
Aurora Medical Center in Kenosha (WI)
Aurora Medical Center in Manitowoc County (WI)
Aurora Medical Center in Oshkosh (WI)
Aurora Medical Center in Summit (WI)
Aurora Medical Center in Washington County (WI)
Aurora Medical Center of Grafton (WI)
Aurora Memorial Hospital of Burlington (WI)
Aurora Sheboygan Memorial Medical Center (WI)
Aurora Sinai Medical Center (WI)
Aurora St. Luke’s Medical Center (WI)
Aurora St. Luke’s South Shore (WI)
Aurora West Allis Medical Center (WI)
Columbia St. Mary—Milwaukee (WI)
Columbia St. Mary—Oconomowoc (WI)
Froedtert Memorial Lutheran Hospital (WI)
ProHealth Care (Waukesha Mem Hospital) (WI)
St. Mary’s Hospital (WI)
Camden Clark Medical Center (WV)
Charleston Area Medical Center (WV)
Charleston Area Medical Center (WV)
St. Mary’s Medical Center (WV)
West Virginia Univ. Hospitals (WV)
APPENDIX B: VQI COMMITTEES

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Nadine Caputo, SVS PSO Quality Director
Dan Neal, SVS PSO Analytics Director
Kenneth Slaw, SVS Staff Liaison

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APPENDIX B: VQI COMMITTEES

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CJ Lee, MD, Upper Midwest Region (Froedtert Health)
Michael McNally, MD, Mid-South Region
(University of Tennessee Medical)
John Moawad, MD, Great Lakes Region
(Summa Health System)
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Jacob Robison, MD, Carolinas Region
(Medical University of South Carolina)
Andres Schanzer, MD, Society for Vascular Surgery/LEB Chair (U Mass Memorial)
Marc Schermerhorn, MD, Society for Vascular Surgery (Beth Israel Deaconess Medical Center)
Darren Schneider, MD, Greater New York Region (Weill Cornell Medical College)
Charles Shanley, MD, Michigan Region (Beaumont Grosse Point)
Taylor Smith, MD, Southern Region (Ochsner Medical Center)
Nam Tran, MD, Pacific Northwest
(Harborview Medical Center - UW Medicine)
Magdiel Trinidad-Hernandez, MD, Rocky Mountain Region/Carotid Artery Stent (Penrose St. Francis—Centura Health)
Todd Vogel, MD, Mid-America Region
(University of Missouri Medical Center)
Grace Wang, MD, Mid-Atlantic Region/Chair, Carotid Artery Stent (University of Pennsylvania)
Karen Woo, MD, Southern California Region
(UCLA Ronald Reagan Medical Center)
Jack Cronenwett, MD, Medical Director (ex-officio)
Jim Wadzinski, SVS PSO General Manager
Carrie Bosela, RN, SVS PSO Administrative Director
Nadine Caputo, SVS PSO Quality Director
Dan Neal, SVS PSO Analytics Director

Venous Quality Council
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Faisal Aziz, MD, Mid-Atlantic Region
(Penn State Milton S. Hershey Medical)
Carl Black, MD, Society of Interventional Radiology Representative
Sabah Butty, MD, Midwest Region
(IU Health—Ball Memorial Hospital)
Brian DeRubertis, MD, Southern California Region
(UCLA Ronald Reagan Medical Center)
Sapan Desai, MD, Mid-America Region
James Froehlich, MD, Society for Vascular Medicine
(University of Michigan)
Antonios Gasparis, MD, American Venous Forum
( Stony Brook University Medical Center)
Eric Hager, MD, Great Lakes Region (UPP Vascular Surgery)
Nasim Hedayati, MD, Northern California Region
(UC Davis Health System)
Mark Iafrati, MD, New England Region (Tufts Medical Center)
Andres Katz, MD, Southern Region
(Texas Health Presbyterian Hospital)
APPENDIX B: VQI COMMITTEES

David Kuwayama, MD, Rocky Mountains Region (University of Colorado- Denver)
Chad Laurich, MD, Upper Midwest Region (Sanford Vascular Associates)
Timothy Liem, MD, Pacific Northwest Region (Oregon Health & Science University)
Judith Lin, MD, Michigan Region (Henry Ford Hospital—Detroit MI)
William Marston, MD, Carolinas Region (University of North Carolina Hospitals)
Mark Meissner, MD, Society for Vascular Surgery (Harborview Medical Center)
Marc Passman, MD, Society for Vascular Surgery (University of Alabama Medical Center)
Gregory Piazza, MD, Society for Vascular Medicine
Joseph Raffetto, MD, American Venous Forum
Krish Soundararajah, MD, Greater New York Region (Mount Sinai Hospital)
David Spinosa, MD, Virginias Region (Inova Alexandria Hospital)
Rob Winter, MD, Southeastern Region (INOVA Health System)
(To be appointed, Mid-South Region)
Jim Wadzinski, SVS PSO General Manager
Carrie Bosela, RN, SVS PSO Administrative Director

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Faisal Aziz MD, Mid-Atlantic (Penn State Milton S. Hershey Medical)
Adam Beck MD, Southeastern (University of Alabama)
Thomas Brothers MD, Carolinas (Medical University of South Carolina)
Ankur Chandra, MD (Scripps Green Hospital)
Peter Henke MD, Michigan (University of Michigan)
Andrew Hoel MD, Mid-America (Northwestern Memorial Hospital)
Rebecca Kelso MD, Great Lakes (Cleveland Clinic)
Larry Kraiss MD, Rocky Mountain (University of Utah)
Mohamed Malas MD, Mid-Atlantic (Johns Hopkins Bayview Medical Center)
Matthew Mell MD, Northern California (Stanford Hospital & Clinics)
Mark Mewissen MD, Upper Midwest (Aurora St. Luke’s Medical Center)
Raghu Motaganahalli MD, MidWest (IU Health-Methodist)
Albeir Mousa MD, Virginias (Charleston Area Medical Center)
Brian Nolan MD, New England (Dartmouth-Hitchcock Medical Center)
Andres Schanzer MD, New England (U Mass Memorial)
Marc Schermerhorn MD, New England (Beth Israel Deaconess Medical Center)
Darren Schneider MD, Greater New York (Weill Cornell Medical College)
Charles Shanley MD, Michigan (Beaumont Grosse Point)
Jeffery Siracuse MD, New England (Boston Medical Center)
Magdiel Trinidad Vazquez MD, Rocky Mountain (Penrose St. Francis)
Karen Woo MD, Southern California (UCLA Reagan)

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Jack Cronenwett MD (Dartmouth-Hitchcock Medical Center)
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Randall DeMartino MD (Mayo Clinic)
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Tej Singh MD (El Camino Hospital)
Taylor Smith MD (Ochsner Medical Center)
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Adam Beck MD (Univ. of Alabama)
Grace Wang MD (University of Pennsylvania)
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James Black MD (Chair) (Johns Hopkins Bayview Medical Center)
Jens Jorgensen MD (Maine Medical Center)
John “Jeb” Hallett MD (Medical University of South Carolina)
Grace Wang MD (University of Pennsylvania)
Daniel Bertges MD (University of Vermont Medical Center)
Fred Weaver MD (University of Southern California)
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Fred Weaver MD (University of Southern California)
Carrie Bosela RN, SVS PSO Administrative Director

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Omid Jazaeri MD (University of Denver)
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Allen Hamden MD (Beth Israel Deaconess Medical Center)
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Eva Rzucidlo MD (Dartmouth-Hitchcock Medical Center)
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Ageliki Vouyouka MD, (Mount Sinai)
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Christian Ochoa, MD (Vice Chair (University of Southern California)
Mark Nehler MD (University of Colorado, Denver)

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Magdiel Trinidad MD, Vice Chair (University of Arizona)
Mark Fleming MD (Mayo Clinic)
Wei Zhou MD (Stanford University)
Mohammed Eslami MD (Boston Medical Center)
Donald Heck MD, Society of NeuroInterventional Surgery (Novant Health Forsyth Medical Center)
Roger Laham MD (Beth Israel Deaconess Medical Center)

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Benjamin Brook MD (Vice Chair (Univ. of Utah)
Shipra Ayra MD (Emory Clinic)
Mark Conrad MD (Massachusetts General Hospital)
Patrick Ryan MD (Centennial MC/TN)
Sapan Desai MD (Southern Illinois MC)
Faisal Aziz MD (Penn State Hershey)
Vincent Gilford MD (Mount Carmel/OH)

PERIPHERAL VASCULAR INTERVENTION
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Tom Brothers MD (Vice Chair) (Medical University of South Carolina)
Joseph Mills MD (Baylor Medical Center/AZ)
Robert Hieb MD (Froedtert Health)
Taylor Smith MD (Ochsner Health System)
William Robinson MD (UMass)
Gary Ansel MD (OhioHealth)
Christopher Abularrage MD (Johns Hopkins Bayview Medical Center)
Paul Bloch MD (Maine Medical Center)
Jerry Cohn MD (Memorial Health University)

HEMODIALYSIS ACCESS
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John Lucas III MD (Vice Chair) (John Lucas III)
Scott Berman MD (Carondelet Heart & Vascular Institute)
Alik Farber MD (Boston Medical Center)
Michael McNally MD (University of Tennessee Medical)
Stephen Hohmann MD (Baylor Jack and Jane Hamilton Heart and Vascular Hospital)
Georges Haddad (Henry Ford Hospital- Detroit MI)
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Charles Keith Ozaki (Brigham and Women’s Hospital)
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Ross Milner MD (Univ. Chicago)
Paul Lajos MD (Mount Sinai)

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Thomas Wakefield, MD (Chair) (University of Michigan)
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Jose Almeida MD (Miami Vein Center)
Judith Lin MD (Henry Ford Hospital)
Kandy Hammond (Varicose Vein Consulting)
Ting Windsor MD (Mount Sinai)
Sang Rehee MD (Baystate/FL)
Venkat Kalapatapu MD (Penn State Hershey)

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Michael Jaff MD (Chair) (Harvard Medical School)
Rumi Faizer MD (University of Minnesota Medical)
Tiffany Whitaker MD (Southern Illinois University School of Medicine)
Shipra Arya MD (Emory Clinic)
Robert Patterson MD, (Rhode Island Hospital—Lifespan)
Joshua Beckman MD (Vanderbilt)
Debabrata Mukherjee MD (Texas Tech University)
James Froehlich MD (University of Michigan)
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Medical University of South Carolina (MUSC)

Great Lakes Vascular Study Group
Dr. Jean Starr
Wexner Medical Center (The Ohio State University)

Michigan Vascular Study Group
Dr. Alex Shepard
Henry Ford Hospital

Mid-America Vascular Study Group
Dr. Joseph Schneider
Central DuPage Hospital

Mid-Atlantic Vascular Study Group
Dr. Grace Wang
Hospital of the University of Pennsylvania

Mid-South Vascular Study Group
Dr. H. Edward Garrett, Jr.
Baptist Memorial Hospital

Midwest Vascular Collaborative
Dr. Gary Lemmon
Indiana University Health System

Northern California Vascular Study Group
Dr. Tej Singh
Palo Alto Medical Foundation/El Camino Hospital

Pacific Northwest Vascular Study Group
Dr. Benjamin Starnes
University of Washington Medical Center

Rocky Mountain Vascular Quality Initiative
Dr. Jeffrey Gilbertson
St. Luke’s Regional Medical Center

Southeastern Vascular Study Group
Dr. Yazan Duwayri
Emory University Hospital

Southern California Vascular Outcomes Improvement Collaborative
Dr. Ahmed Abou-ZamZam
Loma Linda University Medical Center

Southern Vascular Outcomes Network
Dr. Dennis Gable
Baylor University Medical Center at Dallas

Upper Midwest Vascular Network
Dr. Randall DeMartino
Mayo Clinic

Vascular Study Group of Greater New York
Dr. Apostolos Tassiopoulos
Stony Brook University Hospital

Vascular Study Group of New England
Dr. Philip Goodney
Dartmouth-Hitchcock Medical Center

Virginiyas Vascular Study Group
Dr. William Robinson
University of Virginia
In our continuing effort to improve the quality, safety, effectiveness and cost of vascular health, the Vascular Quality Initiative® (VQI) is pleased to provide you with this Center Opportunity Profile for Improvement (COPI) report concerning 30-day stroke rates and one-year survival after elective carotid endarterectomy (CEA) in asymptomatic patients.

CEA for asymptomatic internal carotid artery stenosis is a prophylactic procedure intended to reduce stroke risk. Since the stroke risk without CEA is not high, patients must have both a low risk of perioperative stroke and long expected survival to gain benefit from the procedure. This COPI report provides insight into the 30-day stroke rate after CEA in asymptomatic patients as well as their late survival, to potentially allow better patient selection.
Is your center’s rate significantly different from the regional rate?

Your center’s CEA volume is shown in the table below, as well as the volume for your region and for the VQI overall. In addition, your center’s 30-day stroke rate is shown, with statistical calculations of whether your rate differs significantly from the rates for your region and for the VQI overall.

<table>
<thead>
<tr>
<th>VQI Regions</th>
<th>Number of procedures, 2011-2014</th>
<th>Number of procedures excluded*</th>
<th>Number of procedures included</th>
<th>30-Day Stroke Rate**</th>
</tr>
</thead>
<tbody>
<tr>
<td>YR</td>
<td>150</td>
<td>70</td>
<td>80</td>
<td>0.0%</td>
</tr>
<tr>
<td>VQI</td>
<td>37678</td>
<td>13471</td>
<td>24207</td>
<td>0.9%</td>
</tr>
<tr>
<td>*</td>
<td></td>
<td></td>
<td></td>
<td>0.9%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is your center’s rate significantly different from the regional rate?</th>
<th>Your center</th>
<th>Your region</th>
<th>VQI</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
<td>Center rate is not significantly different from regional rate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Is your center’s rate significantly different from the overall VQI rate?</th>
<th>Your center</th>
<th>Your region</th>
<th>VQI</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS</td>
<td>Center rate is not significantly different from VQI rate</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Patients with non-elective admission and/or prior ipsilateral cortical, ocular or vertebrobasilar event are excluded

** Stroke is defined as any minor or major stroke (excluding TIA) within 30 days of date of surgery
The line graph below shows the percentage of patients experiencing stroke within 30 days after CEA in your center over time, compared with all VQI centers and centers in your region.

In order to decrease the risk of stroke within 30 days after CEA, it is necessary to understand which factors are independently associated with postop stroke. To determine this, we performed multivariable logistic regression regarding patient characteristics, procedure details and post-op complications that might affect the likelihood of stroke. Significant predictors of stroke are listed in the Center Opportunity Profile for Improvement (COPI) report on the next page.

The COPI report lists all risk factors independently associated with stroke after CEA in asymptomatic patients along with the percentage of patients at your center with that risk factor. Factors are highlighted in red if your center was above the 75th percentile (indicating a potential opportunity to reduce your stroke rate) and green if your center was below the 25th percentile (indicating less opportunity). The report also contains the odds ratio (OR) for each risk factor from the logistic regression model. This shows how much each risk factor contributes to the likelihood of stroke. An OR of 2 means patients with this risk factor have twice the odds of stroke compared to a risk factor with an OR of 1. Thus, ORs are a way to rank the risk factor’s impact on the chances of stroke.

Patient characteristics that increase the likelihood of stroke can usually not be modified, but can help in patient selection. Procedure details are potentially modifiable and represent opportunities to reduce chances of stroke. Post-operative complications have a very large influence on the likelihood of stroke and represent the greatest opportunity for improvement.

For more information about your report, contact Carrie Bosela at C.Bosela@svspso.org.

Randy De Martino, MD, Chair, CEA Registry Committee
Your Center Opportunity Profile for Improvement (COPI)

**Legend:**

<table>
<thead>
<tr>
<th>Odds ratio</th>
<th>Your Center</th>
<th>Your Region</th>
<th>VQI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.6</td>
<td>38.8%</td>
<td>39.7%</td>
<td>40.7%</td>
</tr>
<tr>
<td>2.2</td>
<td>5.0%</td>
<td>2.8%</td>
<td>3.2%</td>
</tr>
<tr>
<td>2.0</td>
<td>75.0%</td>
<td>76.2%</td>
<td>62.0%</td>
</tr>
<tr>
<td>2.8</td>
<td>8.8%</td>
<td>6.4%</td>
<td>12.7%</td>
</tr>
<tr>
<td>2.2</td>
<td>1.3%</td>
<td>2.0%</td>
<td>2.1%</td>
</tr>
<tr>
<td>2.0</td>
<td>75.0%</td>
<td>76.2%</td>
<td>62.0%</td>
</tr>
</tbody>
</table>

Excludes patients with non-elective admissions and patients with prior cortical, ocular or vertebrobasilar events.

**Risk factors for 30-Day Stroke After CEA**

<table>
<thead>
<tr>
<th>Patient characteristics</th>
<th>Odds ratio</th>
<th>Your center</th>
<th>Your region</th>
<th>VQI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female (vs. Male)</td>
<td>1.6</td>
<td>38.8%</td>
<td>39.7%</td>
<td>40.7%</td>
</tr>
<tr>
<td>History of aneurysm repair</td>
<td>2.2</td>
<td>5.0%</td>
<td>2.8%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Preop ASA only (vs. ASA+P2Y12 antagonist)</td>
<td>2.0</td>
<td>75.0%</td>
<td>76.2%</td>
<td>62.0%</td>
</tr>
<tr>
<td>Neither preop ASA nor P2Y12 antagonist (vs. both)</td>
<td>2.8</td>
<td>8.8%</td>
<td>6.4%</td>
<td>12.7%</td>
</tr>
<tr>
<td>History of ipsilateral CEA</td>
<td>2.2</td>
<td>1.3%</td>
<td>2.0%</td>
<td>2.1%</td>
</tr>
<tr>
<td>Contralat. stenosis &gt;70% (vs. &lt;50%)</td>
<td>1.6</td>
<td>21.9%</td>
<td>16.7%</td>
<td>18.7%</td>
</tr>
<tr>
<td>Contralateral occlusion (vs. &lt;50% stenosis)</td>
<td>2.7</td>
<td>4.1%</td>
<td>6.0%</td>
<td>5.5%</td>
</tr>
</tbody>
</table>

**Procedure details**

<table>
<thead>
<tr>
<th>Procedure details</th>
<th>Odds ratio</th>
<th>Your center</th>
<th>Your region</th>
<th>VQI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reexplore after closure</td>
<td>9.1</td>
<td>1.3%</td>
<td>2.0%</td>
<td>1.5%</td>
</tr>
</tbody>
</table>

**Postop complications**

<table>
<thead>
<tr>
<th>Postop complications</th>
<th>Odds ratio</th>
<th>Your center</th>
<th>Your region</th>
<th>VQI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cranial nerve injury</td>
<td>3.6</td>
<td>3.8%</td>
<td>3.5%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Dysrhythmia</td>
<td>1.9</td>
<td>1.3%</td>
<td>2.0%</td>
<td>2.0%</td>
</tr>
<tr>
<td>Any postop MI</td>
<td>3.8</td>
<td>0.0%</td>
<td>0.8%</td>
<td>0.8%</td>
</tr>
<tr>
<td>IV meds for</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>hyper/hypotension postop</td>
<td>2.2</td>
<td>40.0%</td>
<td>23.6%</td>
<td>26.4%</td>
</tr>
<tr>
<td>Reperfusion symptoms</td>
<td>29.3</td>
<td>0.0%</td>
<td>0.1%</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

*Note: This report is a patient safety work product generated within the SVS PSO, LLC, and is considered privileged and confidential.*
Surgical site infection (SSI) is known to be a major source of morbidity after lower extremity bypass procedures. Previous work by the Society for Vascular Surgery Vascular Quality Initiative has demonstrated that the use of chlorhexidine as a skin preparation before surgery is protective from SSI.

As a national quality improvement initiative, the VQI previously released a Center Opportunity Profile for Improvement (COPI) regarding modifiable risk factors for SSI after lower extremity bypass. This resulted in increased use of chlorhexidine across the VQI, which corresponded to a decrease in SSI, demonstrating the importance of this initiative.

As a follow-up to the COPI report, we are providing these updated data to demonstrate your use of chlorhexidine as a skin preparation in your LEB patients.

**Rate of Chlorhexidine Skin Prep Use, 2014-August 2015**

<table>
<thead>
<tr>
<th>Number of procedures</th>
<th>VQI Overall</th>
<th>Your Region</th>
<th>You</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chlorhexidine rate</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9101</td>
<td>1562</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>86%</td>
<td>91%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

**Chlorhexidine Rate by Year**

**Chlorhexidine Rate in Your Region (2014-Aug 2015 only)**

**Physicians**

- Other physicians in your region
- You
1. Total Procedure Volume—Procedure volume by site and physician varies significantly by specialism and type of facility.

2. Procedures Submitted with Missing Data (%)—Missing VQI data is important in assessing data quality, process and issues that can be addressed.

3. Procedures with 9 Months or Greater Follow-Up (%)—The SVS PSO has identified an important link between improved outcomes, such as reduced long term complications, and long term follow up with appointments or telephone calls. SVS PSO asks all members to report this percentage.

4. Discharge Medications—Use of statins and antiplatelet medication has shown positive results in reducing post-procedure complications.

5. Infra-inguinal Bypass
   - Percentage of Procedures with Chlorhexidine or Chlorhexidine + Alcohol Skin Prep: Use of chlorhexidine as skin prep has shown reduced levels of SSI in certain sites.
   - Percentage of Procedures with In-Hospital Surgical Site Infection: Levels of SSI are reported, as part of a national QI project to identify related factors, including the use of skin prep.
   - Rate of Major Complications: Overall monitoring of complications, including SSI and the possible impact of specific skin preps.

6. Peripheral Vascular Intervention
   - Percentage of Percutaneous Femoral Procedures Using Ultrasound Guidance.
   - Rate of Hematoma after PVI.
   - Percentage of Patients with ABI or TBI Reported before Procedure.

7. Endovascular AAA
   - Rate of Sac Diameter Reporting at Long-Term Follow-Up.
   - Percentage of Patients with Length of Stay>2 Days.

8. Open AAA
   - Percentage of Patients with LOS>8 Days.
   - In-Hospital Mortality for Non-Ruptured Open AAA.

9. Thoracic Endovascular Aortic Repair
   - Rate of Sac Diameter Reporting at Long-Term Follow-Up.

10. Carotid Endarterectomy
    - Percentage of Patients with LOS>1 Day.
    - Stroke or Death in Hospital.

11. Carotid Artery Stent
    - Stroke or Death in Hospital.

12. Hemodialysis Access
    - Percentage of Primary AVF vs. Graft IVC Filter.
    - Percentage of Temporary Filters with Retrieval or Attempt at Retrieval.

13. Varicose Veins
    - Percentage of Procedures with Complete Patient-Reported Outcome Measures Recorded at Follow-Up. Due to level of outpatient treatment, patient feedback is identified as significant in terms of pain and lifestyle factors.
Hemodialysis Access: Percentage of Primary AVF vs. Graft
Jan 2015-May 2016; excludes patients who already had an access procedure in the same arm.

<table>
<thead>
<tr>
<th>Your center</th>
<th>Your region</th>
<th>VQI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary AVF rate</td>
<td>N</td>
<td>Primary AVF rate</td>
</tr>
<tr>
<td>83%</td>
<td>639</td>
<td>85%</td>
</tr>
</tbody>
</table>

Rate of Primary AVF Access by Year

<table>
<thead>
<tr>
<th>Year</th>
<th>VQI</th>
<th>Your Region</th>
<th>Your Center</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>70%</td>
<td>75%</td>
<td>80%</td>
</tr>
<tr>
<td>2014</td>
<td>75%</td>
<td>80%</td>
<td>85%</td>
</tr>
<tr>
<td>2015</td>
<td>80%</td>
<td>85%</td>
<td>90%</td>
</tr>
<tr>
<td>2016</td>
<td>85%</td>
<td>90%</td>
<td>95%</td>
</tr>
</tbody>
</table>

Primary AVF Access by Center in Your Region
(Jan 2015-May 2016)

* Indicates region's rate is significantly different than overall regional rate.

Primary AVF Access by Region across VQI
(Jan 2015-May 2016)

* Indicates region's rate is significantly different than overall VQI rate.
APPENDIX F—CURRENT BI-ANNUAL REGIONAL REPORTS

Carotid Endarterectomy: Stroke or Death in Hospital
Elective procedures, Jan 2015-May 2016, excluding prior ipsilateral CEA and concomitant CABG

<table>
<thead>
<tr>
<th></th>
<th>Your center</th>
<th>Your region</th>
<th>VQI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total procedures</td>
<td>51</td>
<td>1827</td>
<td>16532</td>
</tr>
<tr>
<td>Overall observed rate</td>
<td>0.0%</td>
<td>1.2%</td>
<td>1.0%</td>
</tr>
<tr>
<td># cases with complete data*</td>
<td>50</td>
<td>1766</td>
<td>15767</td>
</tr>
<tr>
<td>Observed rate in cases with complete data</td>
<td>0.0%</td>
<td>1.2%</td>
<td>1.1%</td>
</tr>
<tr>
<td>Expected rate*</td>
<td>0.8%</td>
<td>1.0%</td>
<td></td>
</tr>
<tr>
<td>p-value (O vs. E)</td>
<td>1.00</td>
<td>0.27</td>
<td></td>
</tr>
</tbody>
</table>

*p<.05 = observed is significantly different from expected

"Expected rate" is the rate estimated by a statistical model that accounts for patient characteristics, including age, gender, race, BMI, comorbidities, medications and stroke and vascular history. "Cases with complete data" include patients who have data on all of those factors.

---

Rate of CEA Stroke or Death in Hospital by Year

CEA Stroke or Death by Center in Your Region (Jan 2015-May 2016)

CEA Stroke or Death by Region across VQI (Jan 2015-May 2016)

YC=Your Center; * = Center rate is significantly different than expected.

YR=Your Region; * = Region's rate is significantly different than expected.

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Thoracic Endovascular Aortic Repair (TEVAR)

<table>
<thead>
<tr>
<th>Carotid Endarterectomy (CEA)</th>
<th>n=14742</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic</td>
<td>54%</td>
</tr>
<tr>
<td>Stenosis &gt; 80%</td>
<td>60%</td>
</tr>
<tr>
<td>General anesthesia</td>
<td>91%</td>
</tr>
<tr>
<td>% shunted under general anesthesia</td>
<td>55%</td>
</tr>
<tr>
<td>% w EEG or stump pressure if not shunted</td>
<td>60%</td>
</tr>
<tr>
<td>Conventional (vs eversion)</td>
<td>86%</td>
</tr>
<tr>
<td>Patched (of conventional)</td>
<td>95%</td>
</tr>
<tr>
<td>Completion duplex</td>
<td>24%</td>
</tr>
<tr>
<td>IV Meds for BP Post op</td>
<td>27%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Carotid Artery Stent (CAS)</th>
<th>n=2423</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asymptomatic</td>
<td>34%</td>
</tr>
<tr>
<td>Stenosis &gt; 80%</td>
<td>63%</td>
</tr>
<tr>
<td>Prior Ipsilateral CEA</td>
<td>26%</td>
</tr>
<tr>
<td>Medical high risk</td>
<td>43%</td>
</tr>
<tr>
<td>Anatomic high risk</td>
<td>48%</td>
</tr>
<tr>
<td>Embolic protection</td>
<td>89%</td>
</tr>
<tr>
<td>Technical failure</td>
<td>0.7%</td>
</tr>
</tbody>
</table>

Thoracic Endovascular Aortic Repair (TEVAR)

<table>
<thead>
<tr>
<th>TEVAR for Dissection</th>
<th>n=449</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication</td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td>45%</td>
</tr>
<tr>
<td>Refractory Hypertension</td>
<td>9%</td>
</tr>
<tr>
<td>Malperfusion</td>
<td>16%</td>
</tr>
<tr>
<td>Rapid Expansion</td>
<td>7%</td>
</tr>
<tr>
<td>Aneurysm</td>
<td>22%</td>
</tr>
<tr>
<td>Rupture</td>
<td>7%</td>
</tr>
<tr>
<td>Uncomplicated</td>
<td>4%</td>
</tr>
<tr>
<td>Urgency:</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>52%</td>
</tr>
<tr>
<td>Urgent</td>
<td>29%</td>
</tr>
<tr>
<td>Emergent</td>
<td>20%</td>
</tr>
<tr>
<td>Dissection Type:</td>
<td></td>
</tr>
<tr>
<td>Acute &lt; 30 days</td>
<td>53%</td>
</tr>
<tr>
<td>Chronic &gt; 30 days</td>
<td>47%</td>
</tr>
<tr>
<td>Mean (SD) number of Devices:</td>
<td></td>
</tr>
<tr>
<td>Aortic</td>
<td>1.9 ± 0.9</td>
</tr>
<tr>
<td>Branch</td>
<td>2.1 ± 1.9</td>
</tr>
<tr>
<td>Conversion to open</td>
<td>0.2%</td>
</tr>
<tr>
<td>In hospital re-intervention</td>
<td>12%</td>
</tr>
<tr>
<td>Status at last follow-up:</td>
<td></td>
</tr>
<tr>
<td>Aneurysm sac diameter change:</td>
<td></td>
</tr>
<tr>
<td>Decrease &lt;=5 mm</td>
<td>23%</td>
</tr>
<tr>
<td>Unchanged</td>
<td>53%</td>
</tr>
<tr>
<td>Increase &gt;=5 mm</td>
<td>24%</td>
</tr>
<tr>
<td>One year re-intervention *</td>
<td>13%</td>
</tr>
<tr>
<td>One year mortality *</td>
<td>14%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEVAR for Aneurysm</th>
<th>n=839</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of aneurysm:</td>
<td></td>
</tr>
<tr>
<td>Degenerative, fusiform</td>
<td>71%</td>
</tr>
<tr>
<td>Degenerative, saccular</td>
<td>22%</td>
</tr>
<tr>
<td>Anastomatic</td>
<td>5%</td>
</tr>
<tr>
<td>Prior Trauma</td>
<td>1%</td>
</tr>
<tr>
<td>Intercostal or visceral patch</td>
<td>2%</td>
</tr>
<tr>
<td>Urgency:</td>
<td></td>
</tr>
<tr>
<td>Elective</td>
<td>82%</td>
</tr>
<tr>
<td>Urgent</td>
<td>11%</td>
</tr>
<tr>
<td>Emergent</td>
<td>7%</td>
</tr>
<tr>
<td>Mean (SD) aneurysm diameter (cm):</td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>6.2 ± 1.5</td>
</tr>
<tr>
<td>Women</td>
<td>6.1 ± 1.5</td>
</tr>
<tr>
<td>Mean (SD) number of Devices:</td>
<td></td>
</tr>
<tr>
<td>Aortic</td>
<td>2.3 ± 1.1</td>
</tr>
<tr>
<td>Branch</td>
<td>3.6 ± 2.0</td>
</tr>
<tr>
<td>Conversion to open</td>
<td>1%</td>
</tr>
<tr>
<td>In hospital re-intervention</td>
<td>7%</td>
</tr>
<tr>
<td>Status at last follow-up:</td>
<td></td>
</tr>
<tr>
<td>Decrease &lt;=5 mm</td>
<td>16%</td>
</tr>
<tr>
<td>Unchanged</td>
<td>74%</td>
</tr>
<tr>
<td>Increase &gt;=5 mm</td>
<td>10%</td>
</tr>
<tr>
<td>Endoleak Type I or III</td>
<td>0%</td>
</tr>
<tr>
<td>Endoleak Type II</td>
<td>0%</td>
</tr>
<tr>
<td>One year re-intervention *</td>
<td>10%</td>
</tr>
<tr>
<td>One year mortality *</td>
<td>14%</td>
</tr>
</tbody>
</table>

*Kaplan-Meier
## Suprainguinal Bypass and Intervention

<table>
<thead>
<tr>
<th></th>
<th>n=2236</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indication CLI</strong></td>
<td>43%</td>
</tr>
<tr>
<td>Mean pre-op ABI (SD)</td>
<td>0.61 (.42)</td>
</tr>
<tr>
<td>Aorto-fem</td>
<td>35%</td>
</tr>
<tr>
<td>Fem-fem</td>
<td>27%</td>
</tr>
<tr>
<td>Axillo-fem</td>
<td>15%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>n=22706</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indication CLI</strong></td>
<td>53%</td>
</tr>
<tr>
<td>Mean pre-op ABI (SD)</td>
<td>0.68 (.45)</td>
</tr>
<tr>
<td>TASC C-D lesions</td>
<td>35%</td>
</tr>
<tr>
<td>Aorta treated</td>
<td>1%</td>
</tr>
<tr>
<td>PTA only</td>
<td>17%</td>
</tr>
<tr>
<td>Included Stent</td>
<td>82%</td>
</tr>
<tr>
<td>Included Atherectomy</td>
<td>1%</td>
</tr>
<tr>
<td>Common iliac treated</td>
<td>18%</td>
</tr>
<tr>
<td>PTA only</td>
<td>13%</td>
</tr>
<tr>
<td>Included Stent</td>
<td>86%</td>
</tr>
<tr>
<td>Included Atherectomy</td>
<td>1%</td>
</tr>
<tr>
<td>External iliac treated</td>
<td>11%</td>
</tr>
<tr>
<td>PTA only</td>
<td>20%</td>
</tr>
<tr>
<td>Included Stent</td>
<td>79%</td>
</tr>
<tr>
<td>Included Atherectomy</td>
<td>1%</td>
</tr>
<tr>
<td>Ultrasound guidance</td>
<td>47%</td>
</tr>
<tr>
<td>Hematoma rate</td>
<td>3%</td>
</tr>
</tbody>
</table>

## Infrarenal Abdominal Aortic Aneurysm (AAA) Repair

### Non-ruptured AAA:

<table>
<thead>
<tr>
<th></th>
<th>n=1286</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean Diameter (SD)</strong></td>
<td>6.1 cm (2.1)</td>
</tr>
<tr>
<td>Supra-renal clamp</td>
<td>38%</td>
</tr>
<tr>
<td>Tube graft (vs iliac or femoral graft)</td>
<td>40%</td>
</tr>
<tr>
<td>Mean Units PRBC (SD)</td>
<td>1.0 (2.2)</td>
</tr>
<tr>
<td>Mean Days in ICU SD</td>
<td>4.2 (6.2)</td>
</tr>
<tr>
<td>Mean Days hospitalized postop (SD)</td>
<td>9.1 (10.4)</td>
</tr>
<tr>
<td>Major complication</td>
<td>43%</td>
</tr>
<tr>
<td>In-hospital death</td>
<td>4%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>n=5976</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean Diameter (SD)</strong></td>
<td>5.6 cm (1.2)</td>
</tr>
<tr>
<td>General anesthesia</td>
<td>91%</td>
</tr>
<tr>
<td>Uni-iliac, fem-fem</td>
<td>8%</td>
</tr>
<tr>
<td>Mean Units PRBC (SD)</td>
<td>0.66 (2.3)</td>
</tr>
<tr>
<td>Mean Days in ICU SD</td>
<td>0.81 (2.6)</td>
</tr>
<tr>
<td>Mean Days hospitalized postop (SD)</td>
<td>2.4 (4.5)</td>
</tr>
<tr>
<td>Major complication</td>
<td>7.5%</td>
</tr>
<tr>
<td>In-hospital death</td>
<td>0.7%</td>
</tr>
</tbody>
</table>

### One-year:

<table>
<thead>
<tr>
<th></th>
<th>Bypass</th>
<th>PVI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Death</strong></td>
<td>4.8%</td>
<td>3.7%</td>
<td>0.46</td>
</tr>
<tr>
<td>Amputation</td>
<td>3.3%</td>
<td>0.9%</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Re-intervention</td>
<td>5.6%</td>
<td>4.0%</td>
<td>0.07</td>
</tr>
<tr>
<td>Occlusion</td>
<td>3.8%</td>
<td>4.1%</td>
<td>0.49</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>n=188</th>
<th>n=5317</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Death</strong></td>
<td>18.8%</td>
<td>15.2%</td>
<td>0.27</td>
</tr>
<tr>
<td>Amputation</td>
<td>16.7%</td>
<td>11.3%</td>
<td>0.14</td>
</tr>
<tr>
<td>Re-intervention</td>
<td>10.3%</td>
<td>7.5%</td>
<td>0.07</td>
</tr>
<tr>
<td>Occlusion</td>
<td>2.7%</td>
<td>9.7%</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

* Kaplan Meier

# Median FU time = 12.7 months
## Infrainguinal Bypass and PVI

<table>
<thead>
<tr>
<th>Infrainguinal Bypass:</th>
<th>n=6121</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication CLI (vs. claudication)</td>
<td>70%</td>
</tr>
<tr>
<td>Mean pre-op ABI (SD)</td>
<td>0.55 (.42)</td>
</tr>
<tr>
<td>Bypass to above knee pop</td>
<td>21%</td>
</tr>
<tr>
<td>% autogenous vein</td>
<td>35%</td>
</tr>
<tr>
<td>Bypass to below knee pop</td>
<td>32%</td>
</tr>
<tr>
<td>% autogenous vein</td>
<td>64%</td>
</tr>
<tr>
<td>Bypass to tibial/pedal</td>
<td>28%</td>
</tr>
<tr>
<td>% autogenous vein</td>
<td>75%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infrainguinal PVI:</th>
<th>n=22706</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication CLI</td>
<td>53%</td>
</tr>
<tr>
<td>Mean pre-op ABI (SD)</td>
<td>0.68 (.45)</td>
</tr>
<tr>
<td>TASC C-D lesions</td>
<td>35%</td>
</tr>
<tr>
<td>SFA treated</td>
<td>29%</td>
</tr>
<tr>
<td>PTA only</td>
<td>27%</td>
</tr>
<tr>
<td>Included Stent</td>
<td>51%</td>
</tr>
<tr>
<td>Included Atherectomy</td>
<td>22%</td>
</tr>
<tr>
<td>Popliteal treated</td>
<td>15%</td>
</tr>
<tr>
<td>PTA only</td>
<td>42%</td>
</tr>
<tr>
<td>Included Stent</td>
<td>35%</td>
</tr>
<tr>
<td>Included Atherectomy</td>
<td>23%</td>
</tr>
<tr>
<td>Tibial treated</td>
<td>17%</td>
</tr>
<tr>
<td>PTA only</td>
<td>69%</td>
</tr>
<tr>
<td>Included Stent</td>
<td>9%</td>
</tr>
<tr>
<td>Included Atherectomy</td>
<td>22%</td>
</tr>
<tr>
<td>Ultrasound guidance puncture</td>
<td>47%</td>
</tr>
<tr>
<td>Hematoma rate (any)</td>
<td>3.3%</td>
</tr>
</tbody>
</table>

### One-year:*

<table>
<thead>
<tr>
<th></th>
<th>Bypass</th>
<th>PVI</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Claudication</td>
<td>940</td>
<td>5317</td>
<td>0.20</td>
</tr>
<tr>
<td>Death</td>
<td>3.2%</td>
<td>3.7%</td>
<td></td>
</tr>
<tr>
<td>Amputation</td>
<td>4.0%</td>
<td>0.9%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Re-intervention</td>
<td>12.3%</td>
<td>4.0%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Occlusion</td>
<td>10.1%</td>
<td>4.1%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>CLI</td>
<td>2577</td>
<td>5466</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>11.7%</td>
<td>15.2%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Amputation</td>
<td>18.9%</td>
<td>11.3%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Re-intervention</td>
<td>19.7%</td>
<td>7.5%</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Occlusion</td>
<td>15.5%</td>
<td>9.7%</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Kaplan Meier

## Inferior Vena Cava Filter

### Inferior Vena Cava Filter Placement

<table>
<thead>
<tr>
<th>n=808</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indication for filter:</td>
</tr>
<tr>
<td>Pulmonary embolism:</td>
</tr>
<tr>
<td>Recurrent PE on anticoagulation</td>
</tr>
<tr>
<td>Anticoagulation contraindicated or inadequate</td>
</tr>
<tr>
<td>On adequate anticoagulation</td>
</tr>
<tr>
<td>Lower Extremity DVT:</td>
</tr>
<tr>
<td>Anticoagulation contraindicated or inadequate</td>
</tr>
<tr>
<td>thrombus</td>
</tr>
<tr>
<td>On adequate anticoagulation, prophylactic</td>
</tr>
<tr>
<td>Prophylactic (No PE or DVT):</td>
</tr>
<tr>
<td>Recent Trauma</td>
</tr>
<tr>
<td>Major Procedure Planned</td>
</tr>
</tbody>
</table>

| Temporary Filters Placed | 74% |
| Temporary Filters Removed/Attempt to remove | 36% |
| Post op New DVT | 4% |
| Post of New PE | 1% |

### Post op Filter complication:

| Migration >20 mm | 0.0% |
| Filter Angle Increase >15 degrees | 0.2% |
| Filter Fracture | 0.2% |
| Caval/Iliac Vein Thrombosis | 0.9% |
| Thrombosis in Filter | 0.4% |
| Embolization filter/fragments | 0.0% |
| Vein Wall perforation | 1.1% |

www.VQI.org  G-3
### Lower Extremity Amputation

<table>
<thead>
<tr>
<th>Major Amputation</th>
<th>n=1924</th>
</tr>
</thead>
<tbody>
<tr>
<td>Above knee</td>
<td>32%</td>
</tr>
<tr>
<td>Below or thru knee</td>
<td>68%</td>
</tr>
</tbody>
</table>

**Status at last follow-up:**

<table>
<thead>
<tr>
<th>Ambulatory status:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ambulatory</td>
<td>19%</td>
</tr>
<tr>
<td>Ambulatory with Assistance</td>
<td>38%</td>
</tr>
<tr>
<td>Wheelchair</td>
<td>41%</td>
</tr>
<tr>
<td>Bedridden</td>
<td>2%</td>
</tr>
</tbody>
</table>

| Prosthetic use             | 45%   |
| Revision to higher level   | 15%   |

<table>
<thead>
<tr>
<th>Due to:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-healing</td>
<td>65%</td>
</tr>
<tr>
<td>Infection</td>
<td>24%</td>
</tr>
<tr>
<td>Progression of disease</td>
<td>11%</td>
</tr>
</tbody>
</table>

| Phantom Limb Pain          | 17%   |
| Joint Contracture          | 1%    |
| Neuroma                    | 1%    |

**Mortality at one year**: 22%

* Kaplan-Meier

---

### Hemodialysis Access

<table>
<thead>
<tr>
<th>Hemodialysis Access Procedures</th>
<th>n=6925</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type of access performed:</td>
<td></td>
</tr>
<tr>
<td>Autogenous fistula</td>
<td>75%</td>
</tr>
<tr>
<td>Prosthetic AV graft straight</td>
<td>13%</td>
</tr>
<tr>
<td>Prosthetic AV graft looped</td>
<td>9%</td>
</tr>
<tr>
<td>Autogenous Vein AV graft</td>
<td>1%</td>
</tr>
<tr>
<td>AV Biograft</td>
<td>2%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reason for graft instead of AVF:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Vein not available</td>
<td>63%</td>
</tr>
<tr>
<td>Acute access needed</td>
<td>5%</td>
</tr>
<tr>
<td>Other, not specified</td>
<td>32%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Pre op vein duplex imaging performed</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>On dialysis at time of procedure</td>
<td>66%</td>
</tr>
</tbody>
</table>

**Status at last follow-up:**

<table>
<thead>
<tr>
<th>Access ever used for dialysis</th>
<th>56%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Access failed within one year</td>
<td>12%</td>
</tr>
</tbody>
</table>

---

### Varicose Vein

<table>
<thead>
<tr>
<th>Varicose Vein Treatment</th>
<th>n=2972</th>
</tr>
</thead>
<tbody>
<tr>
<td>Truncal Vein Treatment:</td>
<td></td>
</tr>
<tr>
<td>Thermal, RF</td>
<td>51%</td>
</tr>
<tr>
<td>Thermal, Laser</td>
<td>39%</td>
</tr>
<tr>
<td>Mechanochemical</td>
<td>1%</td>
</tr>
<tr>
<td>Chemical</td>
<td>1%</td>
</tr>
<tr>
<td>Truncal Surgery</td>
<td>8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cluster Vein Treatment:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Stab Phlebectomy</td>
<td>90%</td>
</tr>
<tr>
<td>Mechanical Phlebectomy</td>
<td>7%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
</tr>
</tbody>
</table>

| Pre Op average CEAP               | 3.2 ± 1.3 |
| Post Op average CEAP              | 2.3 ± 1.6 |
| Preop average VCSS score          | 8.5 ± 3.9 |
| Post Op average VCSS score        | 4.2 ± 3.8 |
| Post Op compression               | 71%     |

| Post Op treated vein recanalyzed  | 1.4%    |

**Post op Complications:**

| Bleeding requiring intervention   | 0.0%   |
| Blister skin                      | 0.2%   |
| DVT                               | 0.9%   |
| Hematoma                          | 0.2%   |
| Paresthesia                       | 1.8%   |
| Pigmentation                      | 0.6%   |
| Superficial phlebitis            | 0.7%   |
| Treatment induced ulcer           | 0.1%   |
| Wound Infection                   | 0.6%   |
| Proximal thrombus extension       | 0.4%   |
APPENDIX H—NATIONAL APPROVED PROJECTS FROM JULY 2015 – JUNE 2016

National Projects

1. Variations in Smoking Habits in Patients Undergoing Treatment for Intermittent Claudications, Loma Linda University Medical Center, Ahmed Abou-Zamzam, MD.
2. Patterns of Presentation and Outcomes of Dialysis Patients Treated for Peripheral Arterial Disease in the VQI, Johns Hopkins Hospital, Mohmoud Malas, MD.
3. Comparison of Open and Endovascular Treatment of Patients with Critical Limb Ischemia with tissue loss and impaired functional status, Boston Medical Center, Jeffery Siracuse, MD and Alik Farber, MD.
4. External Validation of the VSGNE Risk Predictive Model of Mortality after Elective AAA Repair on the VQI-VSGNE Patients and Comparison against Established Models, Boston Medical Center, Mohammad Eslami, MD.
5. External Validation of VSGNE Risk Predictive Model of Early Failure among the Patients with the First Time AV Fistula, Boston Medical Center, Mohammad Eslami, MD.
6. Predictors of Loss to Follow Up in the Vascular Quality Initiative, University of Massachusetts, Dejah Judelson, MD.
7. Outcomes of Stent Grafts compared to Bare Metal Stents for the Treatment of Aortoiliac Occlusive Disease: Factors Influencing Patency of Common Iliac Artery Stents including Medical Management, University of Pittsburgh Medical Center, Elizabeth Genovese, MD.
8. Active Smoking and Its Impact on Lower Extremity Revascularization, University of North Carolina, Raghuveer Vallabhaneni, MD.
9. Association between Antiplatelet Therapy and Bleeding Complications in Open Aortic Aneurysm Repair, Cleveland Clinic, Christopher Smolock, MD.
10. Do African American Patients Experience Better Survival after Intervention for Peripheral Arterial Disease?, The Medical University of South Carolina, Thomas Brothers, MD.
11. A Comparison of Outcomes of EVAR for Ruptured Abdominal Aortic Aneurysm Repair under Local Anesthesia versus General Anesthesia, University of Minnesota, Rumi Faizer, MD.
12. Comparison of Femoral Endarterectomy Plus Open versus Endovascular Inflow Reconstruction for Severe Aortoiliofemoral Occlusive Disease, Stanford University Medical Center University Medical Center, Matthew Mell, MD.
13. Endovascular Treatment of Common and Deep Femoral Artery Disease, Boston Medical Center, Jeffery Siracuse, MD.
14. Analysis of Patterns and Postoperative Outcomes of Drain Placement during Carotid Endarterectomy, Cleveland Clinic Foundation, Christopher Smolock, MD.
15. Disparities in Characteristics, Treatment, and Outcomes in Patients with Premature Peripheral Arterial Disease undergoing Lower Extremity Bypass and Endovascular Intervention, Ohio State University Medical Center, Jean Starr, MD.
16. Long-term Outcomes following Major Lower Extremity Amputation in the VQI, Loma Linda University MC, Ahmed Abou-Zamzam, MD.
17. Perioperative Outcomes following Major Lower Extremity Amputation in the VQI, Loma Linda University MC, Ahmed Abou-Zamzam, MD.
18. Endovascular Repair of Chronic Type B Aortic Dissections: Does Increasing Aortic Zone Coverage affect the Rate of False Lumen Thrombosis?, North Shore University Hospital System, Alfio Carroccio MD, Allan Conway MD.
19. Sex Differences following TEVAR, Beth Israel Deaconess Medical Center, Marc Schermerhorn, MD; Sarah Deery.
20. Peripheral Arterial Disease in Women, Stony Brook, Angela A. Kokkosis, MD.
21. Assessment of Frailty on Vascular Surgery Outcomes, University of Utah, Larry Kraiss, MD and Benjamin Brooke, MD.
22. Evaluating the Potential Regional Effect on Variations in Length of Stay following Carotid Endarterectomy, Stanford University Medical Center, Matthew W. Mell, MD.
23. Frailty as a Predictor of Surgical Outcomes in Vascular Surgery Patients, Emory University, Shipra Arya MD, SM.
24. Trends in Utilization and the Volume-Outcome Relationship in Lower Extremity Bypass in the VQI, University of Virginia, William P. Robinson, MD.
25. Modified Frailty Index as a Predictor of Adverse Surgical Outcomes in Patients undergoing Lower Extremity Bypass, Stanford University Medical Center, George Lee, MD.
26. Comparison of Embolic Protection Devices Used during Carotid Artery Stenting, University of Southern California, Fred A Weaver MD.
27. The Risk Stratification and Impact of Respiratory Adverse Events After Major Vascular Surgery on Short-Term and Long-Term Patient Outcomes, University of Pittsburgh Medical Center, Donald T. Baril, MD.

28. Comparative Outcomes of Open and Endovascular Aneurysm Repair in Young Patients, University of Pittsburgh Medical Center, Nathan L. Liang MD.

29. Outcomes of Familial Abdominal Aortic Aneurysm Repair in the Vascular Quality Initiative, Geisinger Medical Center, Evan Ryer MD.

30. Morbidity and Mortality Associated with Symptomatic Abdominal Aortic Aneurysms, Beth Israel Deaconess Medical Center, Marc Schermerhorn MD & Peter Soden MD.

31. Gender Differences in Patients undergoing Carotid Endarterectomy and Stenting, Beth Israel Deaconess Medical Center, Marc Schermerhorn MD & Peter Soden MD.

32. Predicting Mortality in Ruptured Abdominal Aortic Aneurysms in the Endovascular Era, Maine Medical Center, Christopher Healey, MD, New England.

33. EVAR Outcomes by Era, Dartmouth-Hitchcock Medical Center, Devin Zarkowsky MD.

34. Comparison of EVAR Outcomes by Follow-up Method, Johns Hopkins Hospital & Dartmouth-Hitchcock Medical Center, Caitlin Hicks MD.

35. Variation and Intensity of Medical Therapy DAPT Addendum, Mayo Clinic, Randall DeMartino MD.

36. Practice Patterns and Outcomes of Endovascular Interventions vs Open Bypass for Claudication, UCLA, Peter Lawrence MD.

37. Variations in Transfusion Practices and Their Associations with Perioperative Adverse Events in the Vascular Quality Initiative, Mayo Clinic, Zachary Osborne MD.

38. The Effect of Operative Day of the Week on Postoperative Length of Stay and Mortality for Vascular Surgery Patients, Boston Medical Center, Jeffery Siracuse MD.

39. The Association between Medicare High Risk Criteria and Outcomes following Carotid Revascularization Procedures, John Hopkins Hospital, Mahmoud Malas MD.

40. Use of TEVAR for Traumatic Thoracic Aortic Injury, Beth Israel Deaconess Medical Center, Marc Schermerhorn MD.

41. The Practice of Complex Open AAA Repair and Using Snorkel and Fenestrated Grafts. Predictors of Utilization, Early and Late Outcomes and Interventions, and Survival, Massachusetts General Hospital, Virendra Patel MD.

42. The Effect of Intraoperative Protective Adjuncts during Complex Open AAA Repair in the Vascular Quality Initiative, Massachusetts General Hospital, Virendra Patel MD.

43. Comparison of Anesthesia Type on Perioperative and Long Term Outcomes after Percutaneous EVAR, Boston Medical Center, Jeffrey Siracuse MD.

Regional Projects

1. Validation of University of Washington Preoperative Risk Score for the Prediction of Mortality following Repair of Ruptured Abdominal Aortic Aneurysms, Maine Medical Center, Christopher Healey, MD, New England.

2. Gender Differences in TEVAR, Beth Israel Deaconess Medical Center, Sarah E. Deery MD & Marc Schermerhorn MD, New England.

3. Predictors of Respiratory Complications following AAA Repair, Beth Israel Deaconess Medical Center, Marc Schermerhorn MD & Sara Zettervall MD, New England.

4. What is the Added Morbidity and Mortality of a Concomitant Endarterectomy in Lower Extremity Revascularization, Beth Israel Deaconess Medical Center, Marc Schermerhorn MD & Peter Soden MD, New England.

5. Predictors of Intraoperative transfusion during Endovascular Abdominal Aortic Repair (EVAR), Beth Israel Deaconess Medical Center, Marc Schermerhorn MD & Robina Matyal MD, New England.


7. Comparison of Anesthesia Type on Perioperative and Long Term Outcomes after Percutaneous EVAR, Boston Medical Center, Jeffrey Siracuse MD, Kathryn Van Orden MD, New England.

8. Incision Direction and its Effect on Post-Operative Outcomes Following Infrainguinal Bypass, Beth Israel Deaconess Medical Center, Marc Schermerhorn MD & Katie Shean MD, New England.

10. Comparison of Access Type on Perioperative and Long Term Outcomes after EVAR, Boston Medical Center, Jeffrey Siracuse, MD, New England.

11. Use of TEVAR for Descending Thoracic Aortic Dissection, Beth Israel Deaconess Medical Center, Marc Schermerhorn MD & Sarah Deery MD, New England.

12. Use of TEVAR for Traumatic Thoracic Aortic Injury, Beth Israel Deaconess Medical Center, Marc Schermerhorn MD & Sarah Deery MD, New England.

13. Morbidity and Mortality Associated with Symptomatic Abdominal Aortic Aneurysms, Beth Israel Deaconess Medical Center, Marc Schermerhorn MD & Peter Soden MD, New England.


15. Size of AAA at the Time of EVAR. Indications and Outcomes of Repair of Small Aneurysms, Danbury Hospital, Alan Dietzek MD, Ioannis Kontopidis MD, New England.


22. Incision Direction and its Effect on Post-Operative Outcomes Following Infrainguinal Bypass, Beth Israel Deaconess Medical Center, Marc Schermerhorn MD and Katie Shean MD, New England.

23. Aortic Size Index as a Threshold for Repair in Thoracic and Abdominal Aortic Aneurysms, Beth Israel Deaconess Medical Center, Marc Schermerhorn MD & Sarah Deery MD, New England.

24. Opportunities for outcomes improvement after infrainguinal bypass exist within the GLVSG, Ohio State University Medical Center, Jean Starr MD, Great Lakes.

25. Atherectomy in the SoCal VOICE, UCLA, Karen Woo MD, S. California.


27. Factors Affecting Length of Stay and Discharge Needs After Lower Extremity Amputation, University of Virginia, Margaret C. Tracci MD, Anna Z. Fashandi MD, Virginia.

28. Long term Outcomes after Renal Artery Angioplasty/stenting, West Virginia University, Albeir Mousa, MD, Virginias.

29. Predictors of Patency in Arteriovenous Grafts (AVGs) in Hemodialysis Patients, West Virginia University, Albeir Mousa, MD, Virginias.

30. Short and Long Term Outcomes after Endovascular Subclavian Interventions, West Virginia University, Albeir Mousa, MD, Virginias.

31. The Effects of Vascular Surgeon Demographics on Elective AAA EVAR outcomes, Mount Sinai, Rami Tadros, MD, Chien Yi Png, BA, Greater New York.

32. The Effects of Hospital Demographics on Elective AAA EVAR outcomes, Mount Sinai, Rami Tadros, MD, Chien Yi Png, BA, Greater New York.

33. Risk Models for POMI in CEA, EVAR, OAAA, INFRA and SUPRA, VTMEDNET, Danny Bertges, MD, PSO Quality Projects.

34. Risk Models for 30-day stroke and 1-Year Mortality in CEA, Dartmouth-Hitchcock Medical Center, Randy DeMartino, MD, PSO Quality Projects.
35. Risk Models for 30-day and 1-year Mortality and MACE in TEVAR, University of Florida, Salvador Scali, MD, PSO Quality Projects.


38. ABS Board Performance with VQI Outcomes, University of Utah, Larry Kraiss, MD, PSO Quality Projects.

39. Addendum to Existing Vascular Quality Initiative AHRQ Grant, Dartmouth-Hitchcock Medical Center, Philip Goodney, MD, PSO Quality Projects.