The Vascular Quality Initiative
Using Registries to Provide Clinical Evidence

Jack L. Cronenwett, M.D.
Medical Director
Society for Vascular Surgery Patient Safety Organization
No Disclosures
Vascular Quality Initiative®

Launched by Society for Vascular Surgery in 2011

• **Mission:** To improve the quality, safety, effectiveness and cost of vascular health care by collecting and exchanging information.

• **3 Components:**
  – National Registry in a Patient Safety Organization
  – Regional Quality Improvement Groups
    • Based on Vascular Study Group of New England (2002)
  – Web-based data collection - reporting system
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Participating Centers

VQI Participating Centers

350 Centers, 46 States + Ontario
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Patient Safety Organization (Patient Safety Act)

- Allows patient identified information to be collected for quality improvement without informed consent
- Protects work product (any comparative data) from discovery to encourage honest reporting
- Precludes comparative data to be used for physician disciplinary purposes or marketing
- Allows non-identifiable data to be published
  - Statistical de-identification of patient, provider, hospital
- Ideal vehicle for quality improvement registry
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National Registry in a Patient Safety Organization

• Carotid disease
  – Endarterectomy and stenting

• Aortic disease
  – Open and endovascular abdominal abdominal aneurysm repair
  – Endovascular repair thoracic aorta

• Lower extremity arterial disease
  – Bypass, interventional procedures, amputation
  – Medical management PAD (currently in development)

• Dialysis access

• Vena cava filters

• Varicose veins
Advantages of SVS PSO Registry Data

- Allows data from all patients to be included
  - Not biased by those who only give consent
- Much more detailed information than claims data
  - Pre-, intra-, and post-op variables (> 150 per procedure)
    - Patient demographics, co-morbidities, history
    - Procedure details, including graft or device types
    - Post-treatment outcome and complications
- One year follow-up for key outcomes
  - Completed in physician’s office
- Longer follow-up with matched Medicare Claims
  - Survival also from Social Security Death Index
Freedom from Major Amputation after PVI for Critical Limb Ischemia

Real Time Web-Based Reports

<table>
<thead>
<tr>
<th>Procedure Variable Name</th>
<th>My Center Results (N=179)</th>
<th>All Other National Participants (N=10,270)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freedom From Amputation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Month Rate</td>
<td>0.903</td>
<td>0.934</td>
</tr>
<tr>
<td>One Year Rate</td>
<td>0.838</td>
<td>0.896</td>
</tr>
</tbody>
</table>

Dotted lines represent 95% confidence interval. N refers to number of Legs
Real Time Web-Based Reports

Freedom from Major Amputation after Infrainguinal Bypass for CLI

<table>
<thead>
<tr>
<th>Procedure Variable Name</th>
<th>My Center Results (N=74)</th>
<th>All Other National Participants (N=6,510)</th>
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<tr>
<td>Freedom From Amputation</td>
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<tr>
<td>6 Month Rate</td>
<td>0.886</td>
<td>0.888</td>
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<tr>
<td>One Year Rate</td>
<td>0.858</td>
<td>0.845</td>
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Dotted lines represent 95% confidence interval
### Total Procedures Captured (as of 6/1/2015)

<table>
<thead>
<tr>
<th>Procedure</th>
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<tr>
<td>Carotid Endarterectomy</td>
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<td>TEVAR -Complex EVAR</td>
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<tr>
<td>Hemodialysis Access</td>
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</tr>
<tr>
<td>Lower Extremity Amputations</td>
<td>3,072</td>
</tr>
<tr>
<td>IVC Filter</td>
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<tr>
<td>Varicose Vein</td>
<td>921</td>
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**Total: 216,105 procedures**

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**VQI Total Procedure Volume**

- **7,500 Procedures per Month**

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**Vascular Quality Initiative**

[Graph showing increasing trend from June 2013 to April 2015]
# Vascular Quality Initiative®

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> 100,000 Lower Extremity Arterial Disease Treatment Procedures in VQI Registry
Advantages of SVS PSO Registry Data

- Large number of patients/procedures with long term follow-up to provide clinical evidence
Learning from Big Data and Long-Term Follow-up

• 50,000 Patients in VQI who underwent arterial Rx
  – Leg bypass, intervention, oAAA/EVAR, CEA/CAS
• Evaluated benefit of discharge medications:
  – Antiplatelet agent (ASA, PY212 inhibitors)
  – Statins (HMG-CoA reductase inhibitors)
• Outcomes analyzed:
  – Variation across centers
  – Impact on 5 year patient survival
  – Impact of participation in VQI

-De Martino et al, SVS VAM, June, 2014
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Variation in Optimal Medical Management Across VQI Centers by Procedure

Both Anti-platelet and Statin

Percentage on Both Medications

- 100%
- 80%
- 60%
- 40%
- 20%

Procedure:
- CAS
- CEA
- oAAA
- EVAR
- Supra
- Infra
- PVI
50,000 Patients Treated for Carotid, Aortic or Peripheral Artery Disease:

26% Absolute improvement in 5-year survival when patients are discharged on AP & Statin

Effect of Discharge Medications on Survival

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Optimal Medication at Discharge Improved with Longer Participation in VQI (More feedback)

Number of Years Participating in VQI
Advantages of SVS PSO Registry Data

• Large number of patients/procedures with long term follow-up to provide clinical evidence

• “Big Data” from a registry can be used to answer important clinical questions about best practice
  – Surgical site infection after infrainguinal bypass
Significant variation found across VQI participating centers and regions

Modifiable risk factors associated with SSI:

- Operation > than 220 minutes
- Transfusion > 2 units PRBC
- Skin prep not chlorhexidine
## Center Opportunity Profile for Improvement Report

<table>
<thead>
<tr>
<th>Metric</th>
<th>Your center's number of procedures</th>
<th>120</th>
</tr>
</thead>
<tbody>
<tr>
<td>VQI wound infection rate</td>
<td></td>
<td>3.8%</td>
</tr>
<tr>
<td>Your center’s wound infection rate</td>
<td></td>
<td>9.4%</td>
</tr>
<tr>
<td>Your center’s wound infection expected rate</td>
<td></td>
<td>4.6%</td>
</tr>
<tr>
<td>Observed rate vs. Expected rate</td>
<td></td>
<td>P&lt;.05</td>
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</tbody>
</table>

### Predictors of wound infection

<table>
<thead>
<tr>
<th>Predictor</th>
<th>VQI Average</th>
<th>Your Center</th>
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</thead>
<tbody>
<tr>
<td>Chlorhexidine</td>
<td>79%</td>
<td>32%</td>
</tr>
<tr>
<td>Transfusion &lt; 3 Units</td>
<td>85%</td>
<td>60%</td>
</tr>
<tr>
<td>Procedure time &lt; 220 minutes</td>
<td>50%</td>
<td>49%</td>
</tr>
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**Improvement Opportunity**

Switch to Chlorhexidine. Reduce number of transfusions.
Advantages of SVS PSO Registry Data

- Large number of patients/procedures with long term follow-up to provide clinical evidence
- "Big Data" from a registry can be used to answer important clinical questions about best practice
- Feedback to physicians and centers can rapidly change practice if they have ownership and trust the data
Advantages of SVS PSO Registry Data

• Large number of patients/procedures with long term follow-up to provide clinical evidence

• “Big Data” from a registry can be used to answer important clinical questions about best practice

• Feedback to physicians and centers can rapidly change practice if they have ownership and trust the data

• Practice change can improve outcome!
Centers with Most Improvement in Chlorhexidine Use

Chlorhexidine Use

Infection Rate

Percentage

2011 2013

Percentage

2011 2013
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Push Reporting for Members

In our continuing effort to improve the quality, safety, effectiveness and cost of vascular health, the Society of Vascular Surgery’s Patient Safety Organization (SVS PSO) using the Vascular Quality Initiative® (VQI) is pleased to provide you with this Center Opportunity Profile for Improvement (COPI) report concerning Length of Stay (LOS) after Infrainguinal bypass surgery.

Reducing LOS is a high priority for all of us, in order to reduce cost and hospital acquired morbidity. The data shows that most patients were discharged by the 7th post-operative day after Infrainguinal bypass, but across all VQI participating centers, 21% of patients undergoing elective Infrainguinal surgery had post-operative LOS > 7 days and showed substantial variation across VQI participating centers.

In order to reduce LOS, it is necessary to understand which factors are independently associated with prolonged LOS. To determine this, we performed multivariable logistic regression regarding patient characteristics, procedure details, post-op complications and health system variables, such as physician annual procedure volume and day of week of the procedure. The significant predictors of a longer LOS are listed in the Center Opportunity Profile for Improvement (COPI) report.

To review your Center’s Opportunity for Improvement report, click on Get Report.

You will be prompted for your VQI username and password to sign into this secure site to view your report. Contact your VQI data manager if you need to be reminded of your VQI log in credentials.
Advantages of SVS PSO Registry Data

• Insures entry of all consecutive cases
  – Audited annually against hospital/physician claims data

• Statistically based audits of data accuracy
  – Chart audit for events outside of statistical probability

• Opportunity for comparative effectiveness analysis
  – Open surgery vs interventional treatment in comparable pts
  – Soon medical management and patient reported outcomes

• Real world practice (not selected high volume sites)
  – Academic and community hospitals, multispecialty
350 Hospital Types

- 37% Academic
- 32% Teaching
- 31% Community
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2500 Specialists Performing All Procedures

- Vascular Surgery: 47%
- Radiology: 17%
- Cardiology: 17%
- General Surgery: 11%
- Cardiac Surgery: 5%
- Other: 4%

1600 Specialists Performing PVI Procedures

- Vascular Surgery: 38%
- Radiology: 26%
- Cardiology: 26%
- General Surgery: 10%
- Cardiac Surgery: 17%
- Other: 11%
Substantial variation exists across VQI sites:

- How we select patients for intervention
- Which type of intervention we select

Current Evidence is Interpreted Differently
Current Evidence is Interpreted Differently

- Substantial variation exists across VQI sites:
  - How we select patients for intervention
  - Which type of intervention we select

- Lower extremity PAD treatment:
  - Ankle-Brachial Index (ABI) is a physiologic indicator of disease severity (lower ABI = worse disease)
  - Patients with claudication (vs critical limb ischemia) have subjective indications for intervention (vs medical Rx)
  - How much does mean ABI among claudicants selected for intervention (Bypass vs PVI) vary among VQI centers?
Mean ABI in Claudicants Treated with Bypass vs PVI

Overall PVI mean = 0.65
Overall bypass mean = 0.54

VQI Centers
Mean ABI in Claudicants Treated with Bypass vs PVI

Low Threshold: More Patients Treated

High Threshold: Few Patients Treated
Current Evidence is Interpreted Differently

• Substantial variation exists across VQI sites:
  – How we select patients for intervention
  – Which type of intervention we select

• Lower extremity PAD treatment:
  – Surgical bypass and peripheral vascular intervention (PVI) are alternate treatment options for patients with PAD
  – Selection may vary based on disease severity, physician bias or patient preference
  – How much does treatment type selected for PAD vary among VQI centers?
Claudication: 26% Treated with Bypass (vs. PVI)

Large Variation in Procedure Selection in Different Centers

More PVI

More Bypass
Critical Limb Ischemia: 31% Treated by Bypass (vs PVI)

Larger Variation in Procedure Selection in Different Centers

More PVI

More Bypass
Clinical Evidence from SVS PSO Registry

- Research by VQI members using de-identified data
  - >50 national, >100 regional projects, > 60 publications
  - Outcome of carotid endarterectomy vs. stenting in comparable medical risk patients
  - Determinants of amputation free survival after peripheral vascular intervention for critical limb ischemia
  - Pre-operative beta-blockers prior to major elective vascular surgery do not improve cardiac outcomes and may be harmful
  - Comparison of graft patency, limb salvage, and antithrombotic therapy between prosthetic and autogenous below-knee bypass for critical limb ischemia
Registries Can Provide Real World Evidence Regarding Appropriate Treatment

- Correct indication (patient selection)
- Correct treatment (procedure selection)
- Correct outcomes
  - Early
  - Late
  - Patient reported

- Registries can inform Medicare coverage decisions based on appropriateness assessment
Opportunities for Support

• Encourage participation in certified registries
  – Certify registries that can assess appropriateness correctly
  – Increase procedure payment for participants in certified registries, reduce payment for non-participants

• Encourage proper outcome assessment in registries
  – Provide certified registries with more rapid, lower cost access to Medicare claims data for non-biased reporting
  – Incent providers for entering detailed follow-up data not available in Medicare claims
  – Provide grant support for certified registries to establish electronic patient reported outcome methodology