



# **The Vascular Quality Initiative**

## **Using Registries to Provide Clinical Evidence**

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Society for Vascular Surgery Patient Safety Organization

# Vascular Quality Initiative®

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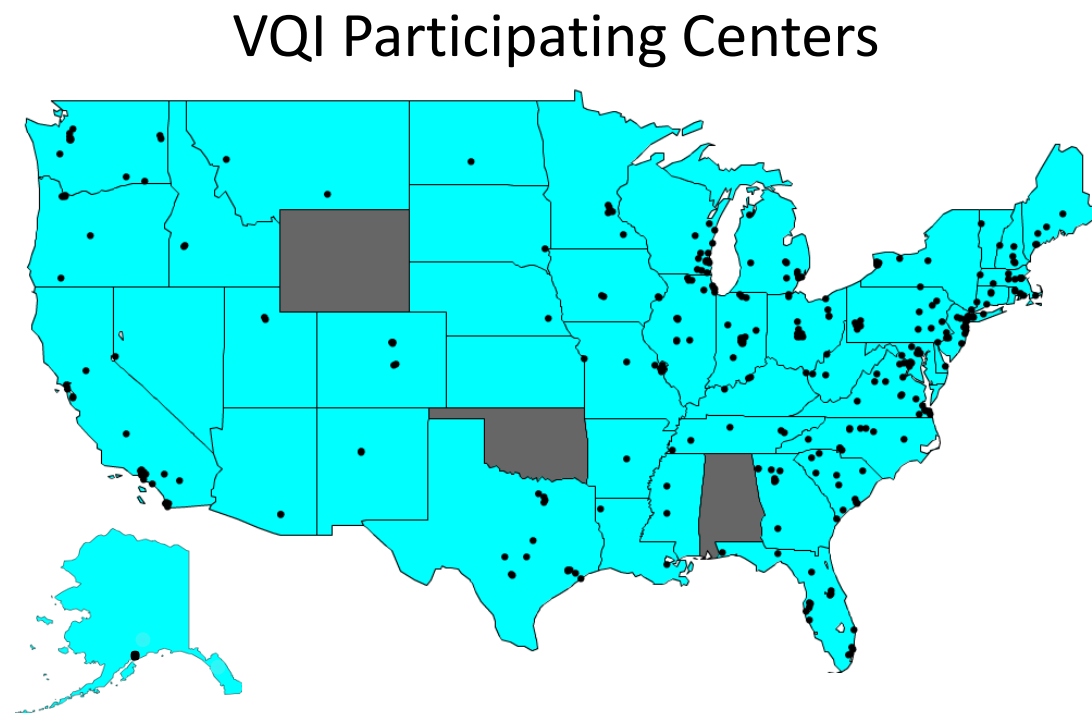
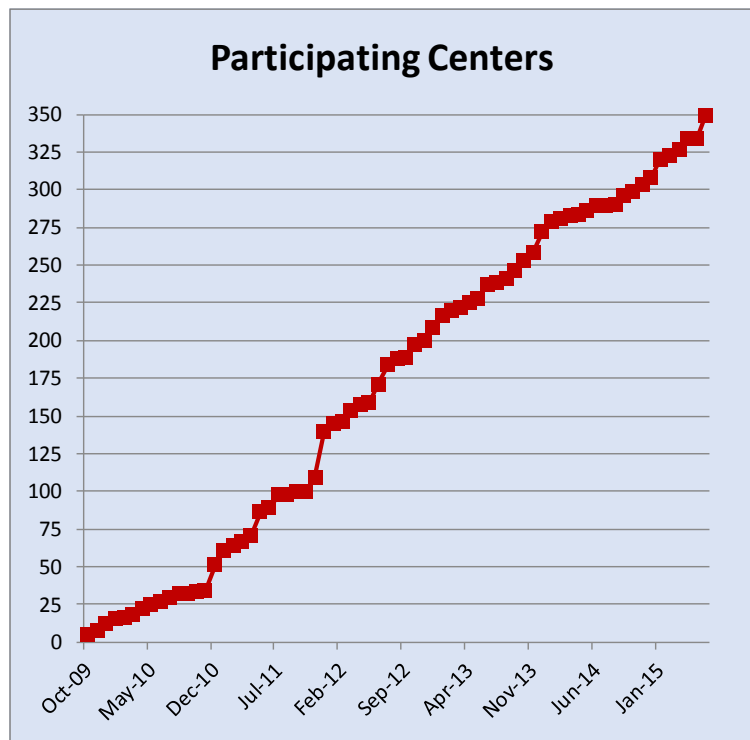
**No Disclosures**

# 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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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

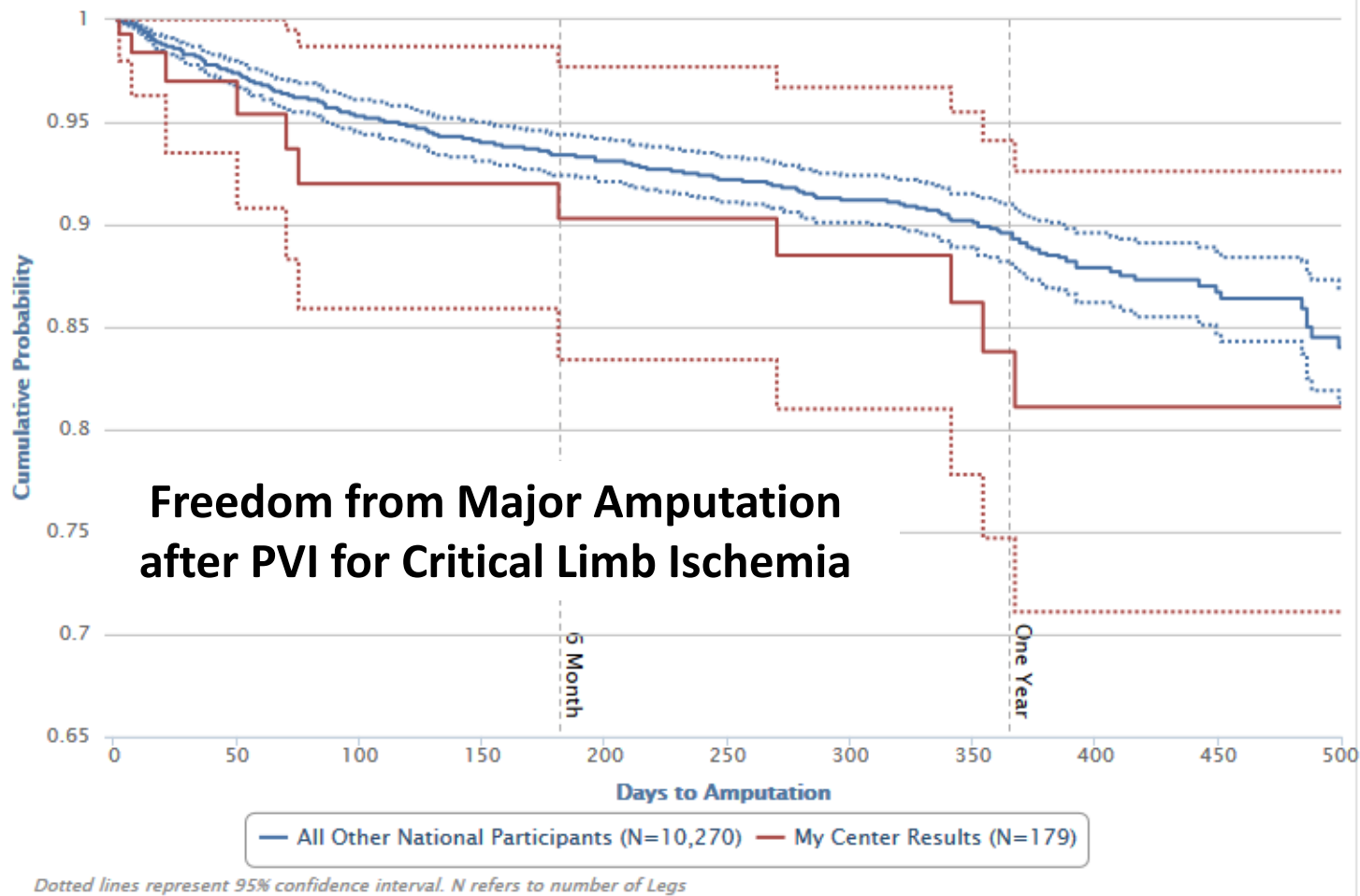
- Carotid disease
  - Endarterectomy and stenting
- Aortic disease
  - Open and endovascular abdominal aneurysm repair
  - Endovascular repair thoracic aorta
- Lower extremity arterial disease
  - Bypass, interventional procedures, amputation
  - Medical management PAD (*currently in development*)
- Dialysis access
- Vena cava filters
- Varicose veins

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## 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

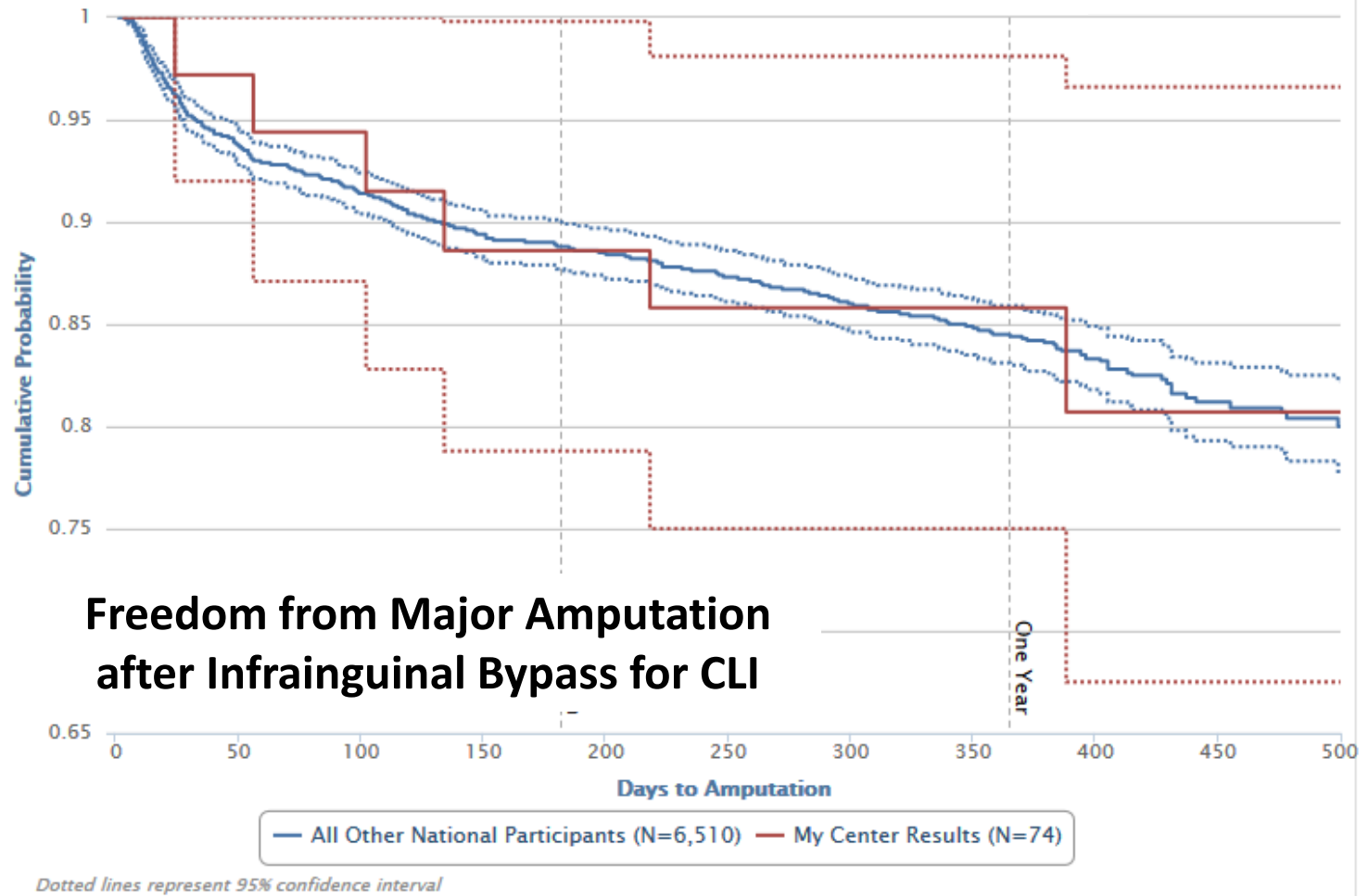
# Real Time Web-Based Reports



| Procedure Variable Name | My Center Results (N=179) | All Other National Participants (N=10,270) |
|-------------------------|---------------------------|--|
| Freedom From Amputation |                           |  |
| 6 Month Rate            | 0.903                     | 0.934                                      |
| One Year Rate           | 0.838                     | 0.896                                      |



# Real Time Web-Based Reports

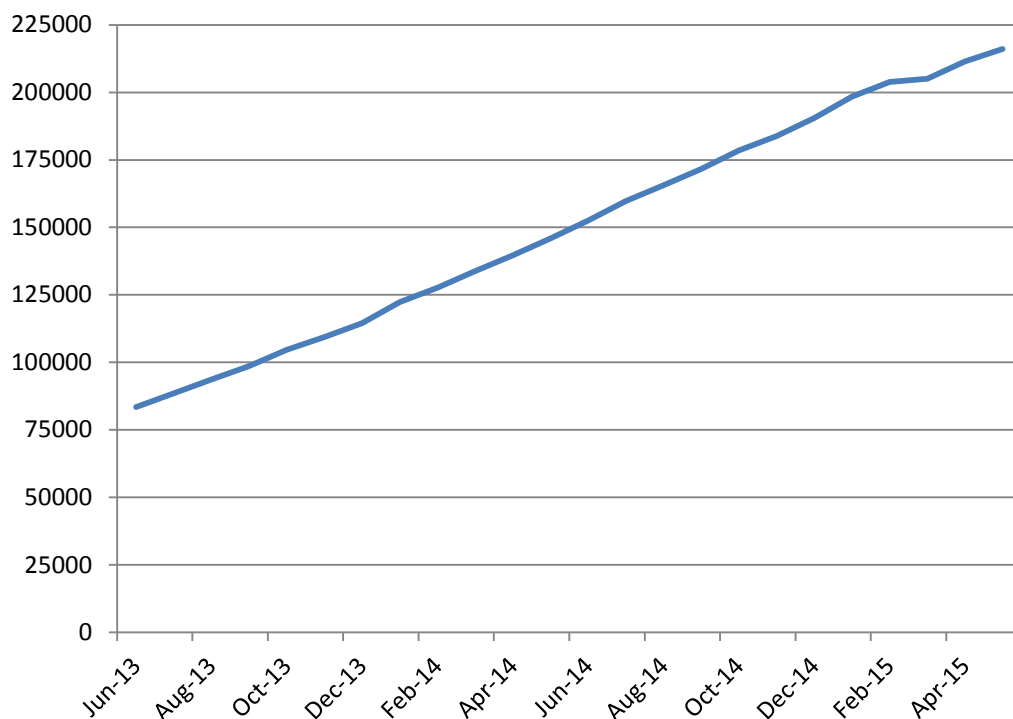


| Procedure Variable Name        | My Center Results (N=74) | All Other National Participants (N=6,510) |
|--------------------------------|--------------------------|---|
| <b>Freedom From Amputation</b> |                          |   |
| 6 Month Rate                   | 0.886                    | 0.888                                     |
| One Year Rate                  | 0.858                    | 0.845                                     |

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| Total Procedures Captured<br>(as of 6/1/2015) | 216,105 |
|---|---------|
| Carotid Endarterectomy                        | 51,569  |
| Carotid Artery Stent                          | 8,016   |
| Endovascular AAA Repair                       | 20,486  |
| Open AAA Repair                               | 6,871   |
| Peripheral Vascular Intervention              | 67,514  |
| Infra-Inguinal Bypass                         | 24,169  |
| Supra-Inguinal Bypass                         | 7,954   |
| TEVAR -Complex EVAR                           | 4,267   |
| Hemodialysis Access                           | 18,170  |
| Lower Extremity Amputations                   | 3,072   |
| IVC Filter                                    | 3,096   |
| Varicose Vein                                 | 921     |

VQI Total Procedure Volume



**7,500 Procedures per Month**

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**> 100,000 Lower Extremity Arterial Disease Treatment Procedures in VQI Registry**

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## Advantages of SVS PSO Registry Data

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

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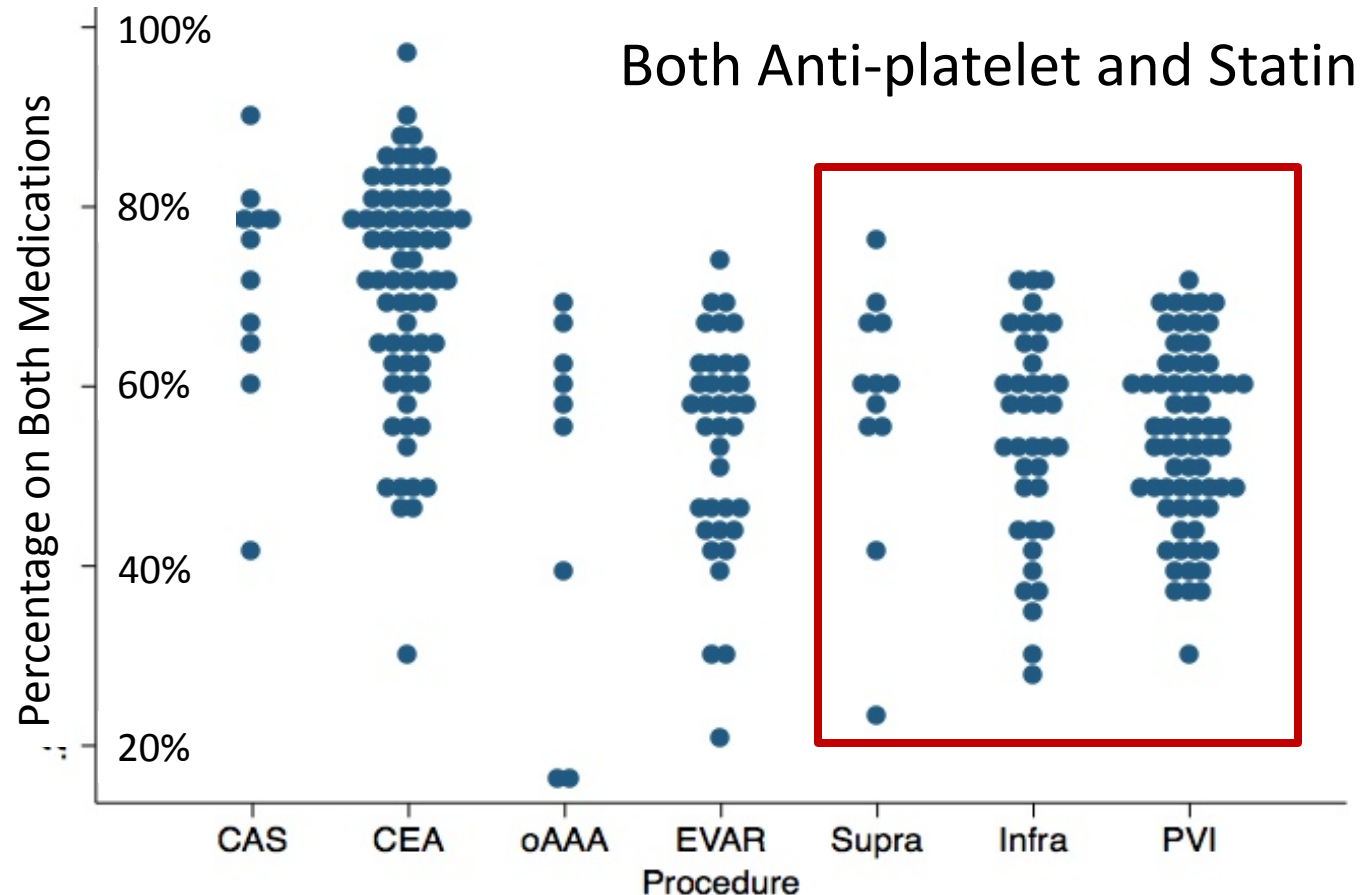
## Learning from Big Data and Long-Term Follow-up

- 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

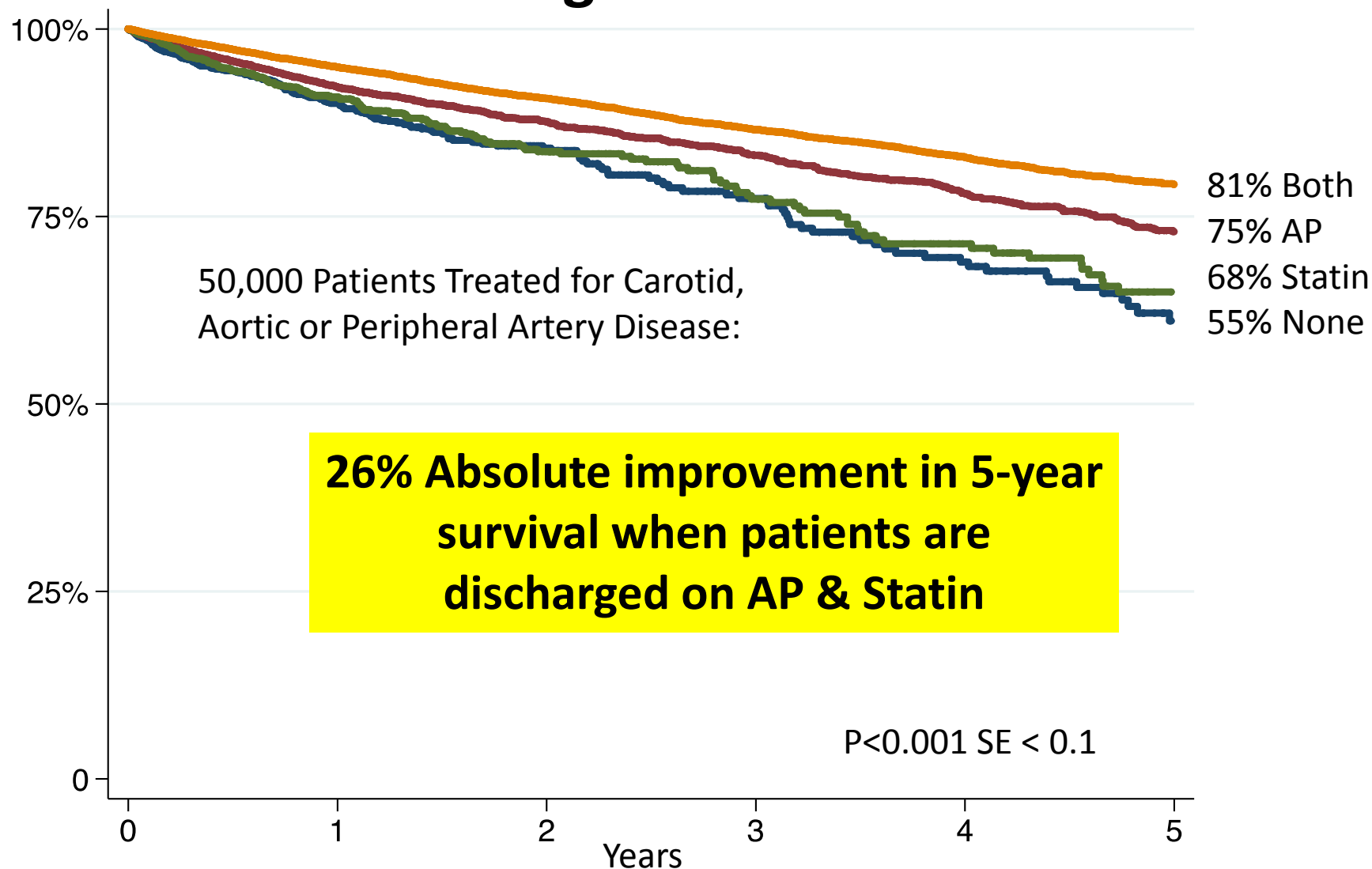
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## Variation in Optimal Medical Management Across VQI Centers by Procedure



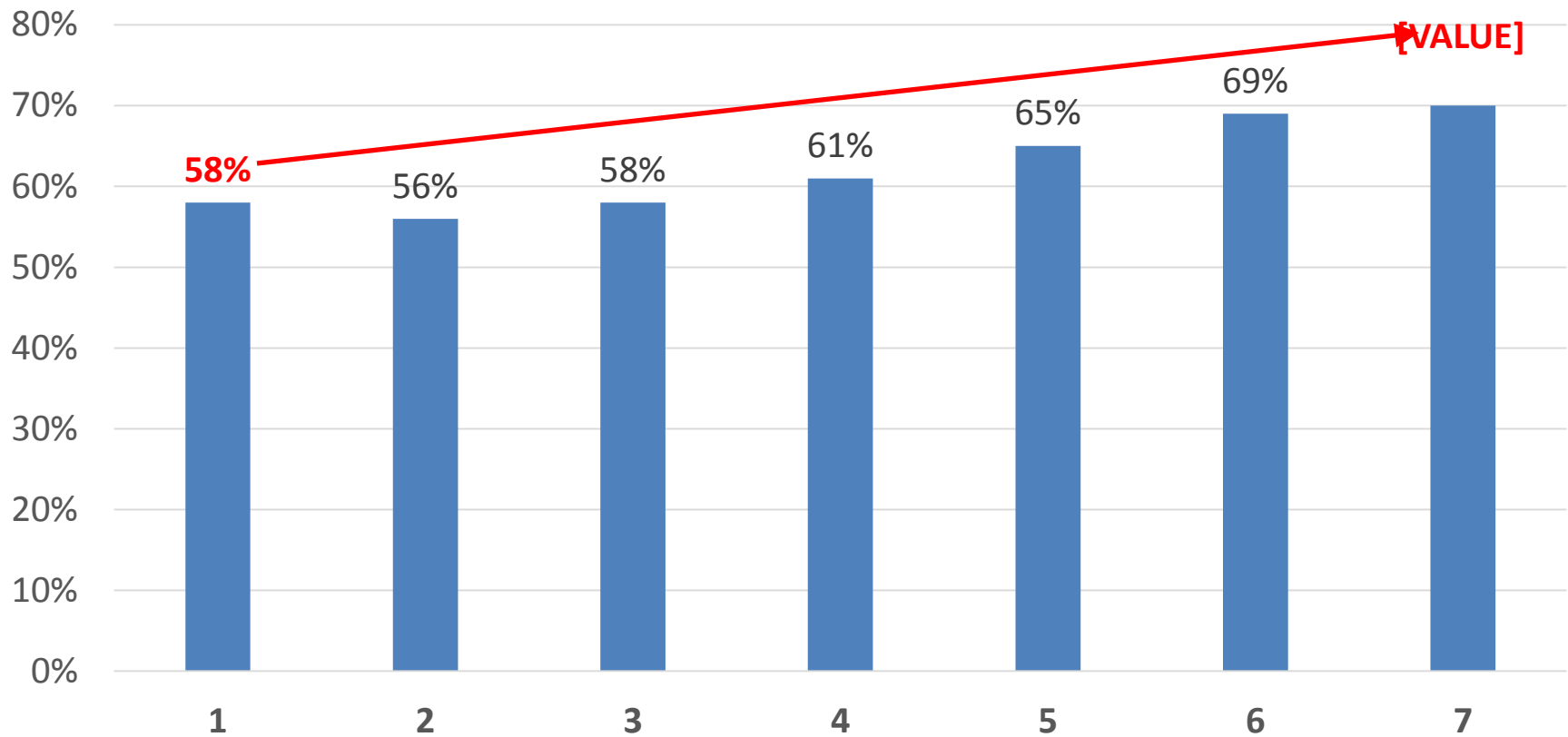
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## Effect of Discharge Medications on Survival



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



Number of Years Participating in VQI



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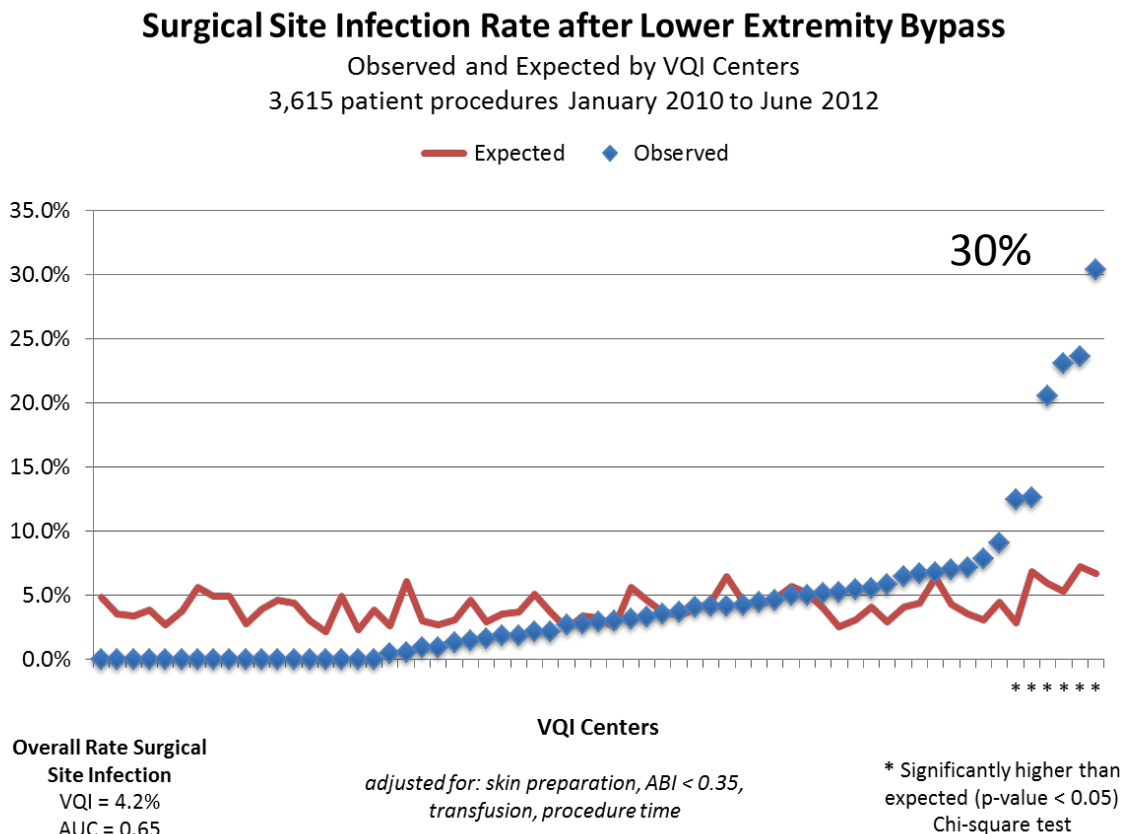
## Advantages of SVS PSO Registry Data

- 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

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## In-Hospital 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



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## COPI Report for SSI after Lower Extremity Bypass

### Center Opportunity Profile for Improvement Report

|             |   |                              |  |   |
|-------------|---|------------------------------|--|---|
|             | Your center's number of procedures          |                              | 120                                    |   |
|             | VQI wound infection rate                    |                              | 3.8%                                   |   |
|             | Your center's wound infection rate          |                              | 9.4%                                   |   |
|             | Your center's wound infection expected rate |                              | 4.6%                                   |   |
|             | Observed rate vs. Expected rate             |                              | P<.05                                  |   |
|             | Predictors of wound infection               |                              |  | Your Center   |
| VQI Average | Chlorhexidine<br>79%                        | Transfusion < 3<br>Units 85% | Procedure time<br>< 220 minutes<br>50% | Improvement Opportunity                                 |
|             | Higher is better                            | Higher is better             | Higher is better                       |   |
| Your center | 32%   | 60%                          | 49%                                    |   |
|             |   |                              |  | Switch to Chlorhexidine. Reduce number of transfusions. |

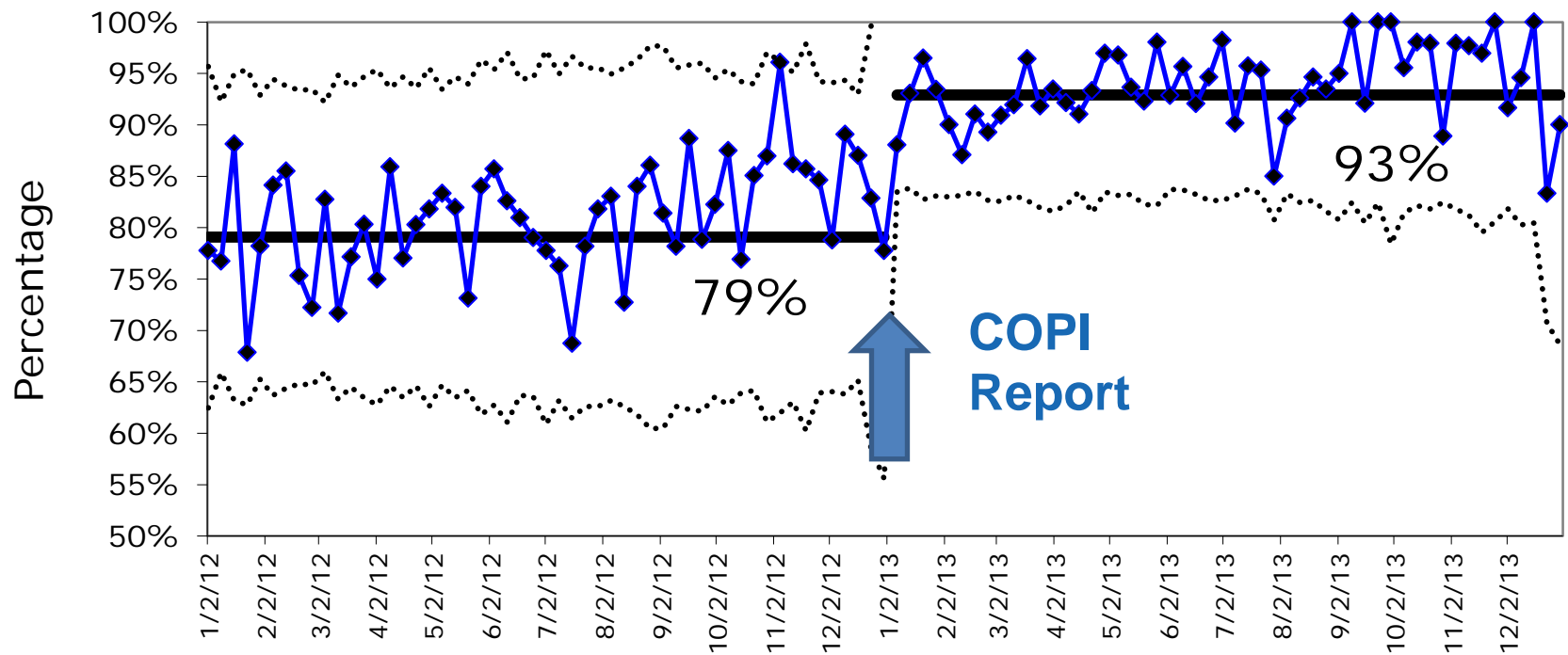
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- Feedback to physicians and centers can rapidly change practice if they have ownership and trust the data

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## Chlorhexidine Skin Prep Use



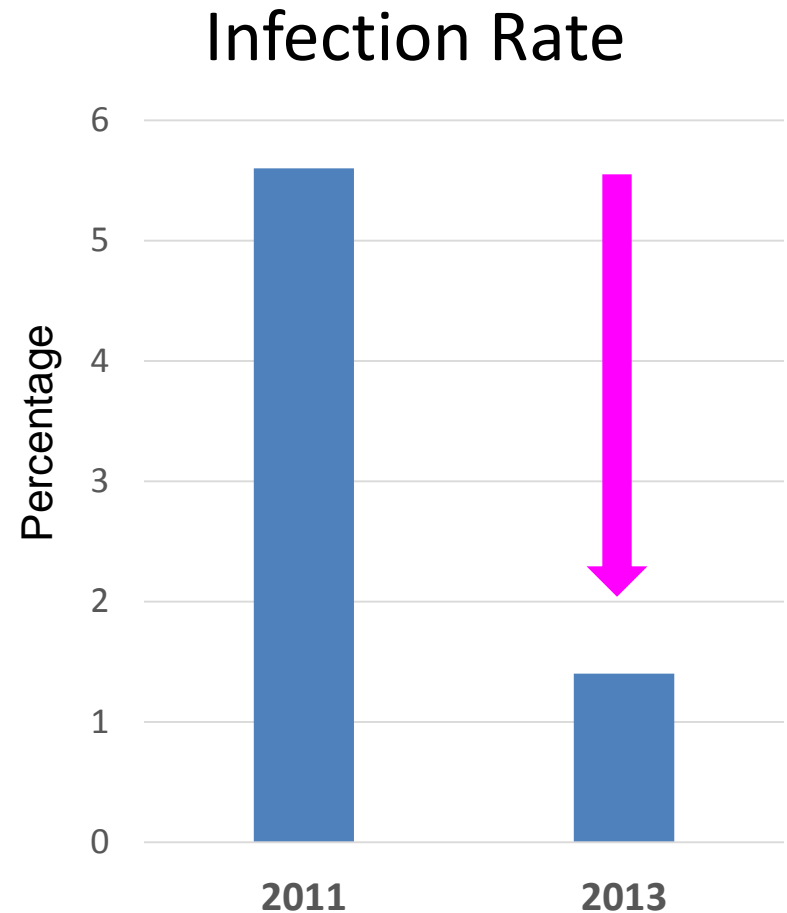
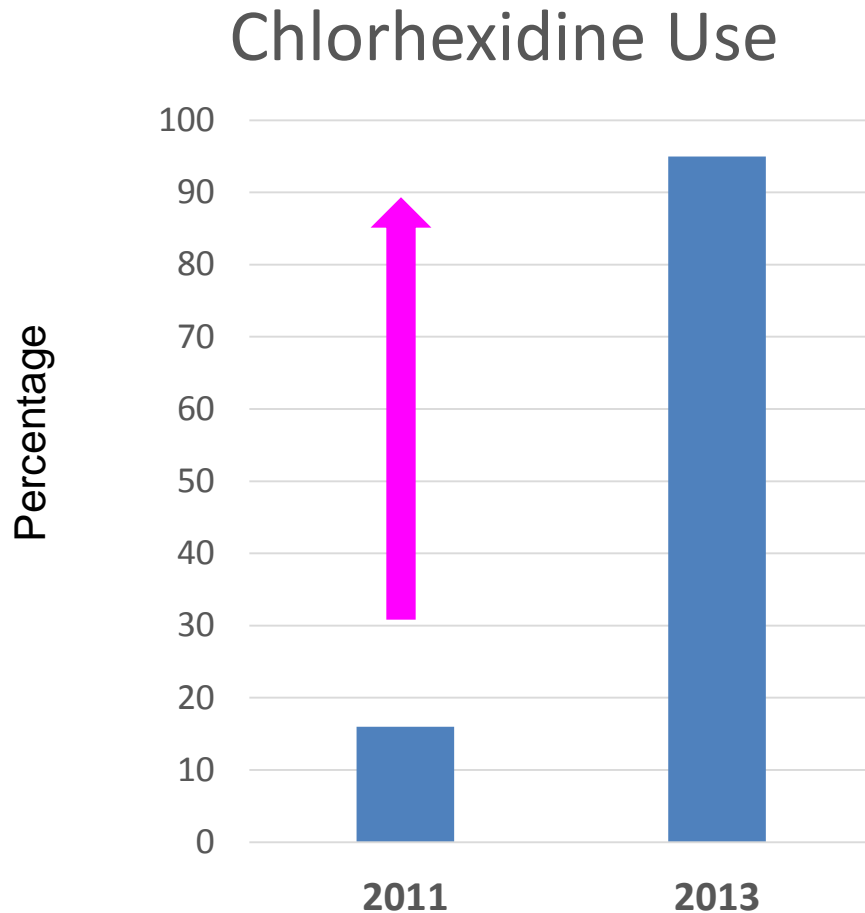
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- Large number of patients/procedures with long term follow-up to provide clinical evidence
- “Big Data” from a registry can be used to answer important clinical questions about best practice
- Feedback to physicians and centers can rapidly change practice if they have ownership and trust the data
- Practice change can improve outcome!

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## Centers with Most Improvement in Chlorhexidine Use





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## Vascular Quality Initiative® 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 Infra-inguinal 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 Infra-inguinal bypass, but across all VQI participating centers, 21% of patients undergoing elective Infra-inguinal 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.

**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.

## Length of Stay after Leg Bypass

### Your Center Opportunity Profile for Improvement (COPI)

Legend: ≤ 25th percentile ≥ 75th percentile

Excludes patients who died prior to 8 days, outliers (>365 days) in LOS, age < 40, Asymptomatic and Not Treated in Ipsilateral Indication, None in Ipsilateral Pathology

| INFRA: Risk factors for LOS>7 days |            | % Patients with risk factor |             |       |
|------------------------------------|------------|-----------------------------|-------------|-------|
| Patient characteristics            | Odds ratio | Your center                 | Your region | VQI   |
| CHF (ref=None)                     |            |                             |             |       |
| Mild                               | 1.2        | 5.9%                        | 11.3%       | 10.0% |
| Moderate                           | 1.7        | 7.8%                        | 3.7%        | 5.4%  |
| Severe                             | 3.8        | 2.7%                        | 0.6%        | 0.7%  |
| Homeless                           | 2.9        | 0.0%                        | 0.3%        | 0.3%  |
| Indication (ref=Claud.)            |            |                             |             |       |
| Rest Pain                          | 1.6        | 30.6%                       | 21.7%       | 23.1% |
| Tissue Loss                        | 2.5        | 44.7%                       | 50.8%       | 49.4% |
| Preop ambul. (ref=Amb)             |            |                             |             |       |
| W/asst. or wheelchair              | 1.3        | 19.2%                       | 22.2%       | 24.5% |
| Bedridden                          | 2.7        | 0.5%                        | 0.4%        | 0.5%  |
| Procedure details                  |            |                             |             |       |
| Urgency (ref=Elective)             |            |                             |             |       |
| Urgent                             | 1.5        | 31.5%                       | 24.3%       | 21.5% |
| Emergent                           | 2.3        | 0.9%                        | 2.8%        | 3.7%  |
| Postop complications               |            |                             |             |       |
| Wound infection                    | 4.3        | 10.0%                       | 3.6%        | 3.5%  |
| Transfusion > 2 units              | 4.3        | 8.7%                        | 9.9%        | 13.0% |
| MI (ref=No)                        |            |                             |             |       |
| Troponin only                      | 3.1        | 2.3%                        | 1.6%        | 1.5%  |
| EKG or clinical                    | 4.6        | 5.0%                        | 1.3%        | 1.1%  |
| Dysrhythmia                        | 2.3        | 8.2%                        | 3.9%        | 3.7%  |
| Respiratory (ref=None)             |            |                             |             |       |
| Pneumonia                          | 5.2        | 0.5%                        | 0.8%        | 0.8%  |
| Ventilator postop                  | 11.7       | 1.4%                        | 0.8%        | 1.3%  |
| Reoperation                        | 5.1        | 12.8%                       | 11.4%       | 11.3% |
| Ipsilateral amp. (ref=No)          |            |                             |             |       |
| Minor                              | 3          | 8.7%                        | 5.6%        | 7.1%  |
| Major                              | 6.3        | 0.5%                        | 1.6%        | 1.8%  |
| Dschg. Anticoag. (ref=No)          |            |                             |             |       |
| Warfarin                           | 1.6        | 33.8%                       | 28.3%       | 25.5% |



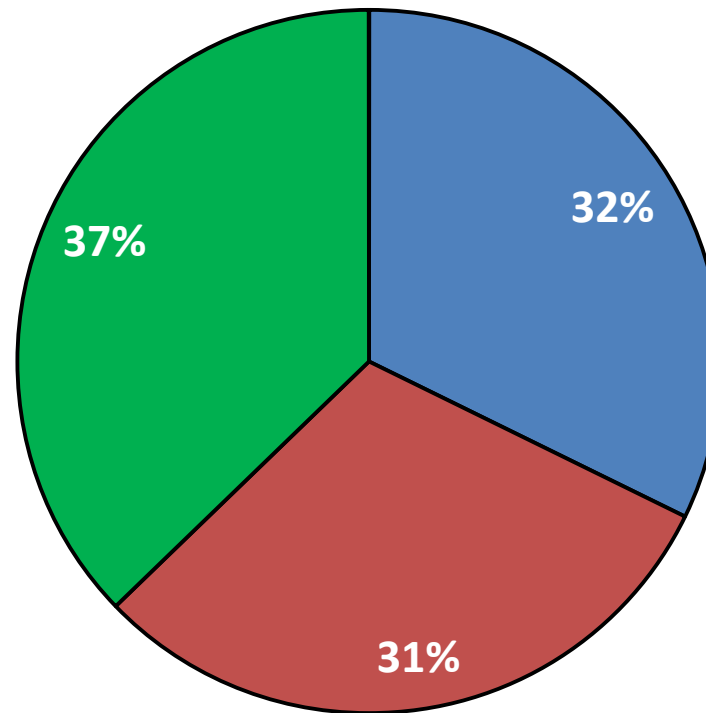
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## Advantages of SVS PSO Registry Data

- 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

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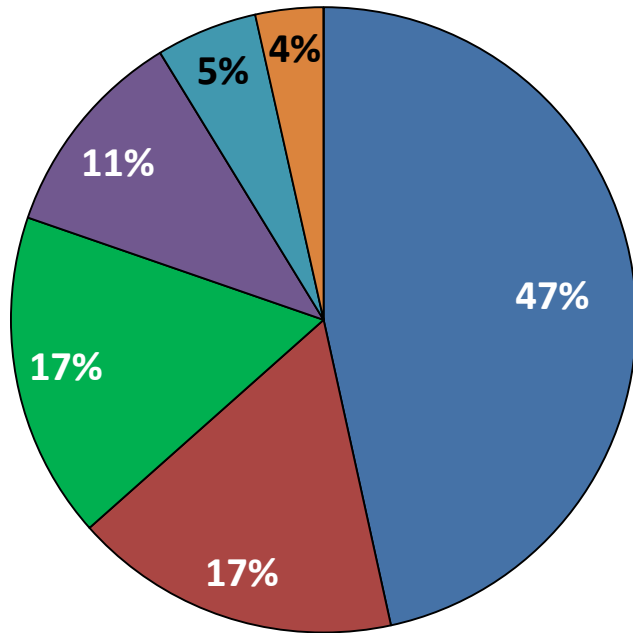
## 350 Hospital Types



■ Academic   ■ Teaching   ■ Community

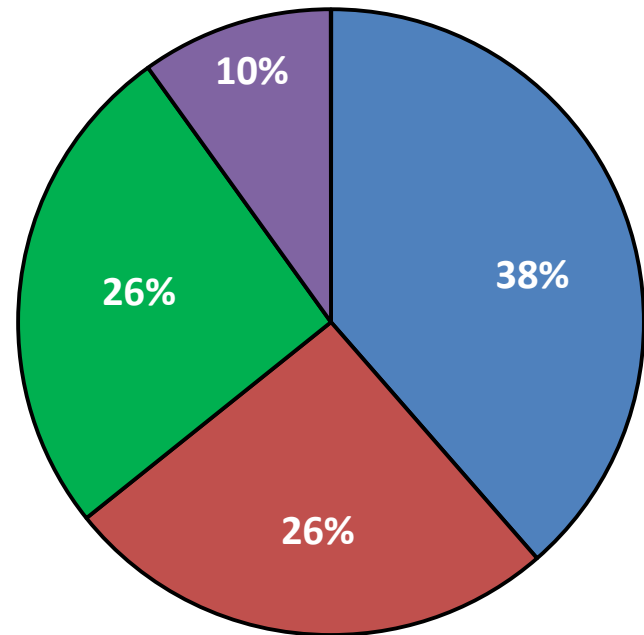
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**2500 Specialists  
Performing All Procedures**



■ Vascular Surgery   ■ Radiology  
■ Cardiology   ■ General Surgery  
■ Cardiac Surgery   ■ Other

**1600 Specialists  
Performing PVI Procedures**



■ Vascular Surgery   ■ Radiology  
■ Cardiology   ■ General Surgery

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## Current Evidence is Interpreted Differently

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

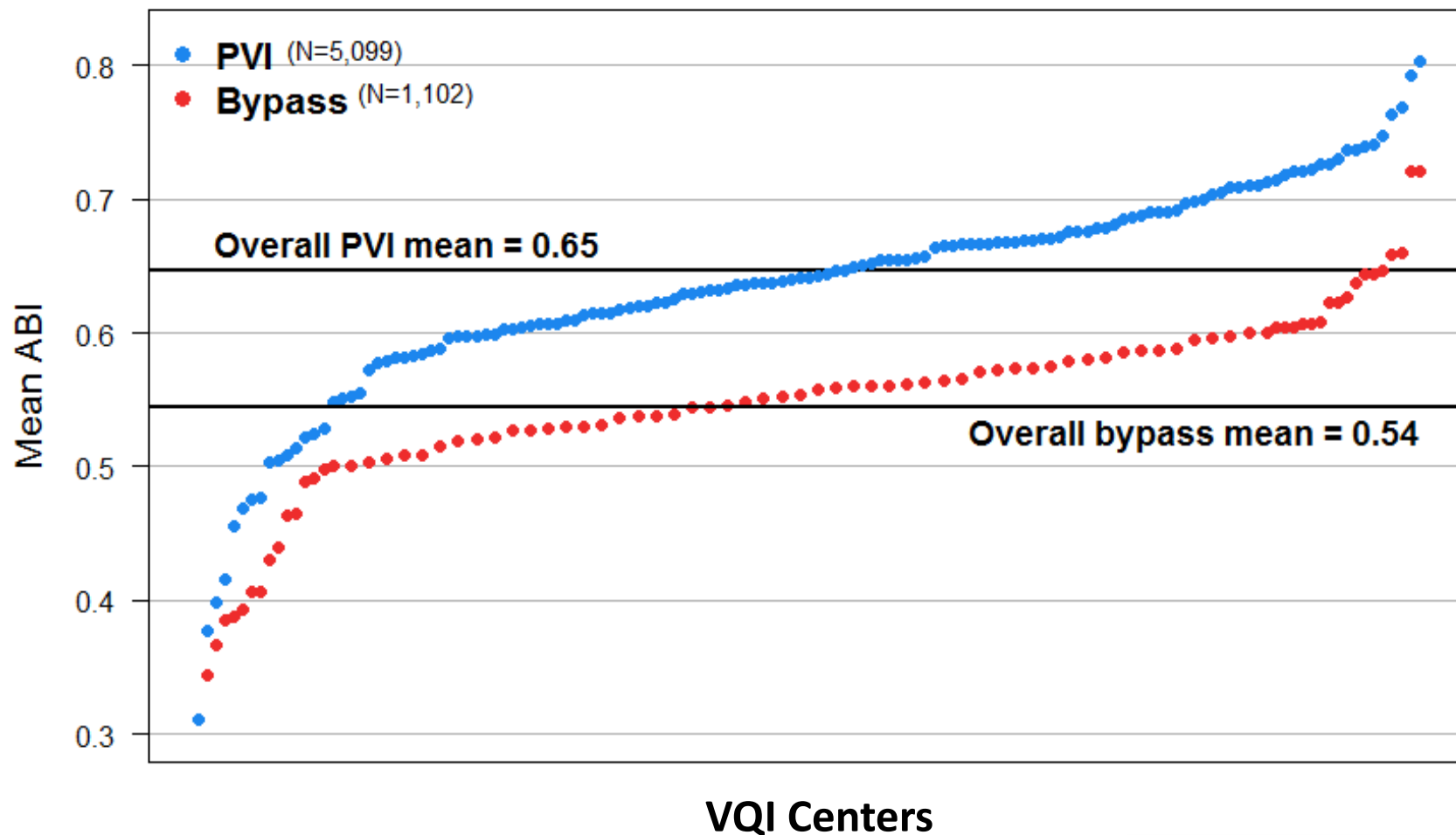
# Vascular Quality Initiative®

## 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?

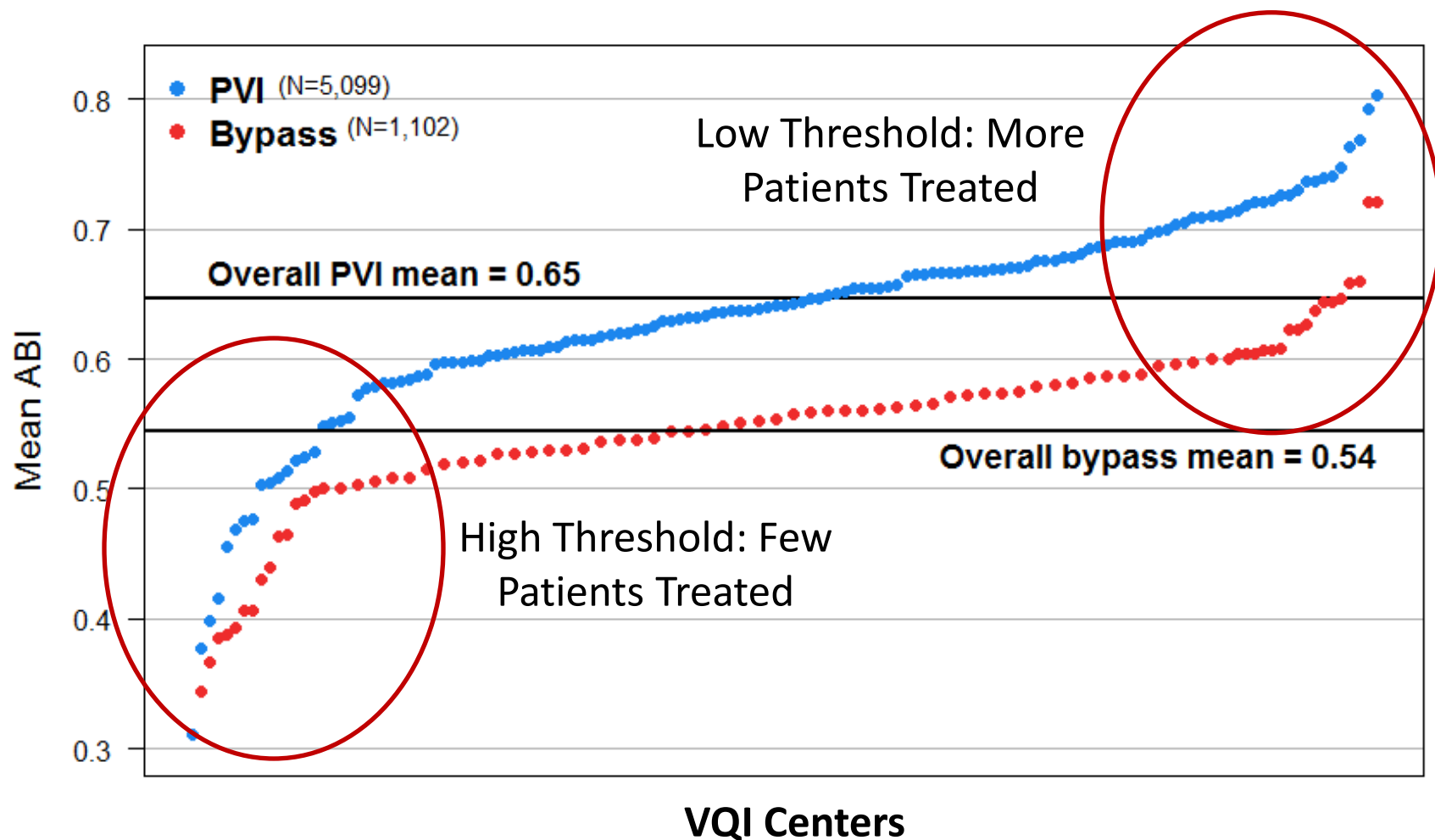
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## Mean ABI in Claudicants Treated with Bypass vs PVI



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## Mean ABI in Claudicants Treated with Bypass vs PVI



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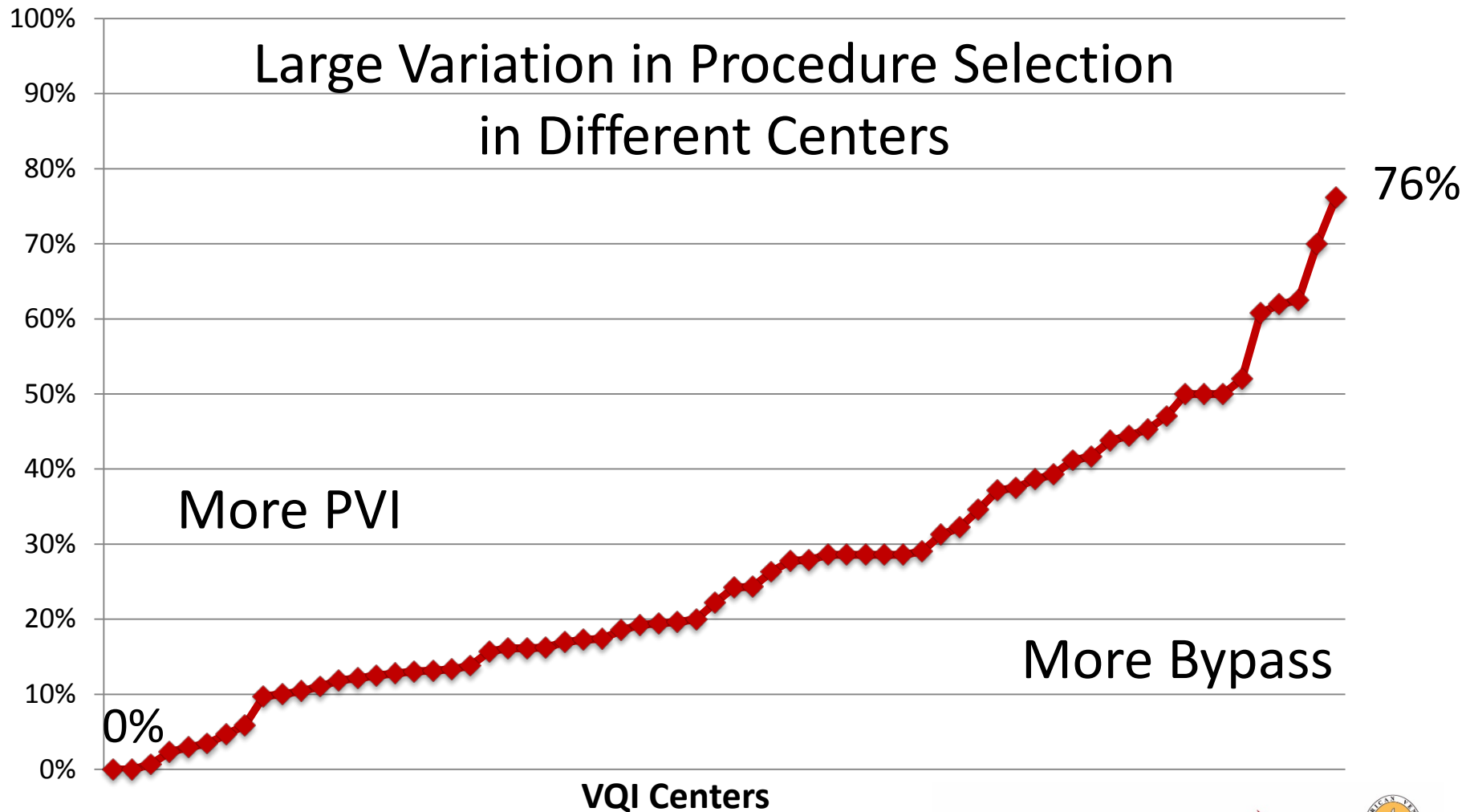
## Current Evidence is Interpreted Differently

- 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?



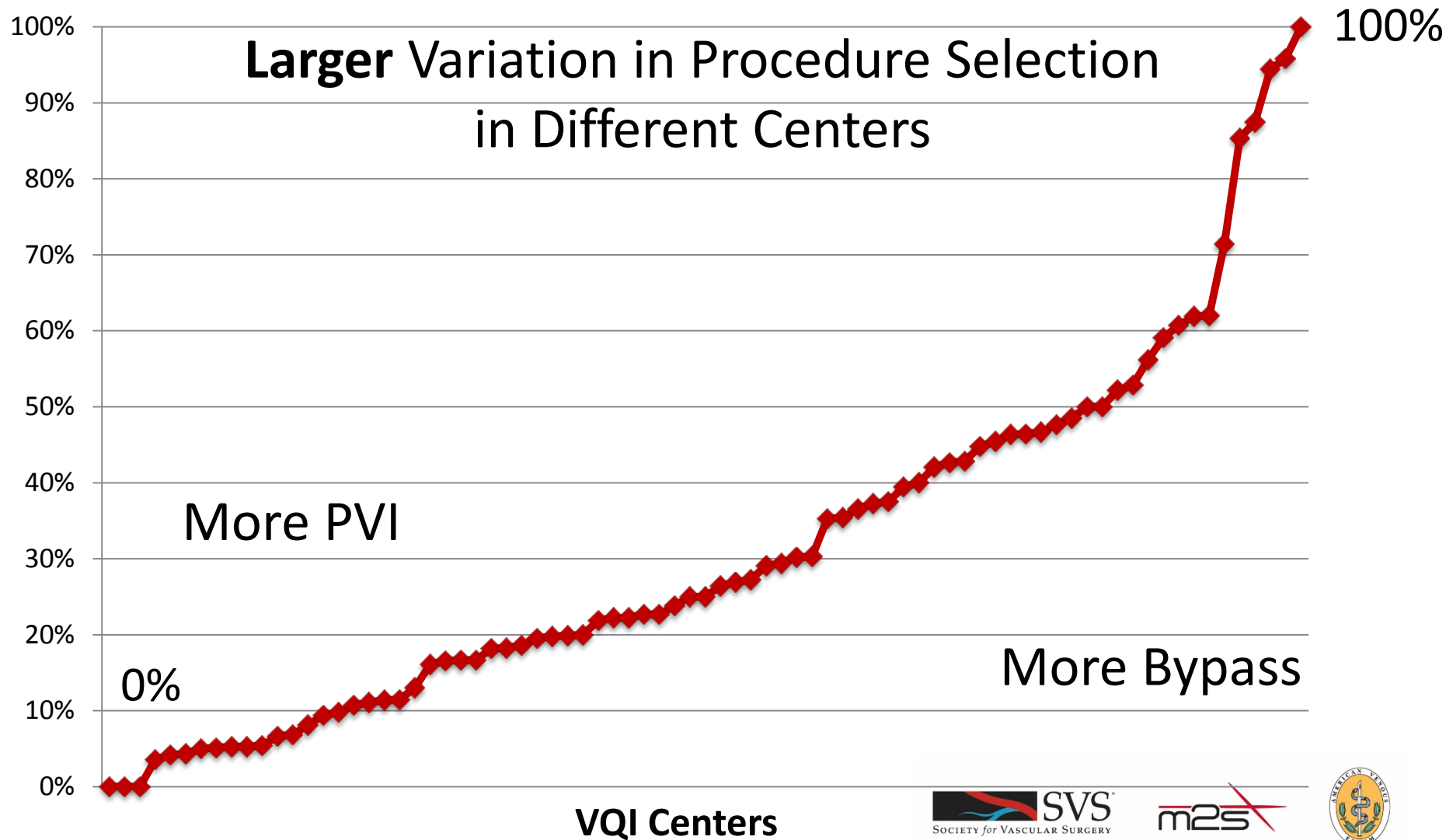
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## Claudication: 26% Treated with Bypass (vs. PVI)



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



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## 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

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## 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

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## 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