The Role of Vascular Surgeons in Quality Improvement

The New England Society for Vascular Surgery

Robert R. Linton Lecture

Jack L. Cronenwett, M.D.

Dartmouth-Hitchcock Medical Center
The sedimentation rate of blood as an index of the hemorrhagic tendency in obstructive jaundice. Linton RR. Ann Surg. 1930;9:694-704

What is Health Care Quality?

- Structure
- Process
- Outcome

-Donabedian, JAMA, 1988
Surgeon’s View of Quality

Surgeon

Operation

Outcome
Surgeon’s View of Quality

Surgeon

Operation

Outcome

Improved Function

+  

−

Morbidity-Mortality
Morbidity & Mortality Conference

- **Benefits:**
  - Feedback from peers
  - Potential learning from others

- **Limitations:**
  - Analysis of individual cases
    - Difficult to recognize any patterns
  - Emphasize the role of chance
    - May obscure the impact of process of care
  - Incomplete picture
    - Single case vs. summary of all cases
What is Quality Improvement?
Quality Improvement ≠ Quality Assurance

Quality Assurance

- Set minimum standards, thresholds
- Identify hospital, physicians that don’t meet minimum standards
- Improve or eliminate “bad apples”

Limitations:
- Embraces “good enough” vs. “best”
- Punitive: elicits fear, resentment
- Targeted process may not improve outcome
Quality Improvement

- Industry-statistical derived concept
  - Juran, Shewhart, Deming

- Continuous quality improvement
  - Plan new process
  - Do the new process
  - Check (measure) the outcome
  - Act on data to refine process
  - Repeat the PDCA cycle for improvement
Quality Lessons from Industry

Based on Continuous Quality Improvement

1. Measure important outcomes.
2. Benchmark with others.
3. Reduce variation.

“Measure to Manage”
Quality Improvement in Practice

- Most surgeons don’t track outcomes.
  - Benchmarks with others not available.
Quality Improvement in Practice

- Most surgeons don’t track outcomes.
  - Benchmarks with others not available.

- Difficult for individual surgeon to recognize variation or improve quality.
  - Even in a busy practice, the small number of adverse events prevents recognition of patterns that could be improved.
Quality Improvement in Practice

- Most surgeons don’t track outcomes.
  - Benchmarks with others not available.

- Difficult for individual surgeon to recognize variation or improve quality.
  - Even in a busy practice, the small number of adverse events prevents recognition of patterns that could be improved.

- Surgical practice is quite insular.
  - Precludes discussions about granular processes that may be important
How Can Surgeons Improve Quality?

1. By assuming responsibility for all structure and process variables that affect outcome
Process of Surgical Care

- Operation $\rightarrow$ Outcome
Process of Surgical Care

- Patient selection for treatment
- Pre-operative evaluation
- Medical risk reduction
- Operation selection (endo vs. open)
- Operation
- Post-operative care
- Post-discharge care
- Long-term follow-up care

→ Outcome
How Can Surgeons Improve Quality?

1. By assuming responsibility for all structure and process variables that affect outcome

2. By aggregating data across surgeons and centers to reveal variation in process and outcome that can be analyzed to select best practice
How Can Surgeons Improve Quality?

1. By assuming responsibility for all structure and process variables that affect outcome

2. By aggregating data across surgeons and centers to reveal variation in process and outcome that can be analyzed to select best practice.

3. By acting on data to reduce variation
Variation in Rate of Surgical Procedures

Rate in Each Hospital Referral Region

Standardized Discharge Ratio (Log Scale)

10.0

Good Agreement on Indications

1.0

Little Agreement on Indications

0.1

Hip Fracture Repair

Radical Prostatectomy
Variation in Rate of Vascular Procedures

Standardized Discharge Ratio (Log Scale)

Rate in Each Hospital Referral Region

- Hip Fracture Repair
- Elective AAA Repair
- Major Amputation
- Carotid Endarterectomy
- Surgical Bypass
- Radical Prostate
- Initial Vascular Access Surgery
- Angioplasty/Stenting
- Vena Cava Filter Placement
Ratio of Rates of Carotid Endarterectomy per 1,000 Medicare Patients to the U.S. Average

1.30 to 2.19 (53)
1.10 to < 1.30 (63)
0.90 to < 1.10 (86)
0.75 to < 0.90 (50)
0.30 to < 0.75 (54)
Not Populated

7-Fold Variation
Strategies to Reduce Variation

- **Selective referral**
  - Steer patients to best surgeons, centers
    - Leapfrog, Payers Centers of Excellence
  - **Advantages:**
    - Easy, inexpensive
    - Traction with payers, patients
  - **Disadvantages:**
    - Highly polarizing for surgeons, centers
    - Difficult to identify best surgeon at individual level

Strategies to Reduce Variation

- **Process compliance**
  - Increase use of evidence-based care processes
    - SCIP: peri-op antibiotics, DVT prophylaxis
  - Advantages:
    - Can achieve rapid improvement in selected processes of care
  - Disadvantages:
    - Improving processes may not reduce variation in ultimate outcome, e.g. mortality
    - Surgeons resist dictated practice changes

Strategies to Reduce Variation

- **Outcome measurement**
  - Feedback outcomes data to stimulate local improvement efforts
    - STS, NSQIP, Regional groups
  - **Advantages:**
    - Measurement alone can effect change (Hawthorne effect)
    - Surgeons prefer to find solutions
  - **Disadvantages:**
    - Lack of insight into how to improve may limit extent of improvement

Regional Outcome Measurement

- **Northern New England Cardiac Group**
  - Organized in 1987 in ME, NH, VT

- Analyzed regional variation to determine the best processes of care
  - Shared database
  - Anonymous benchmarking
  - Discussion at semi-annual meetings

- Improved mortality after CABG
  - 24% decrease after 5 years
Vascular Study Group of New England

- Initial Planning Meetings in 2001
  - Vascular Surgeons from 8 centers
- Agreed on Mission: Improve patient care
- Use NNE Cardiac Study Group methods
Unique Aspects of VSGNE Database

- One year follow-up for key outcomes
  - Completed in surgeon’s office
- Prospective, consecutive cases
  - Audited against claims data
- Surgeon and center level reports
  - Benchmark comparison with others
- Detailed clinical data
  - Pre-, intra-, and post-op variables
- Academic and community hospitals
  - Real world practice
Focus on Quality Improvement

- **Track key procedures**
  - CEA, CAS, EVAR, open AAA, lower extremity bypass and interventions
  - Key procedures provide overall insight
  - Recording all procedures is unrealistic

- **Semi-annual Meetings**
  - Critical to success, durability of group
  - Stimulate cooperative quality projects
  - Overcome insular nature of practice with granular conversations about quality
Recent Meeting Agenda

• AV access and TEVAR working groups report
• CLI treatment preference survey results
• Panel: Lower extremity bypass: Techniques that work
• VSG CRI cardiac risk online prediction tool
• Predicting respiratory failure after elective OAAA repair
• Carotid patch and re-stenosis update
• Intensive glucose management in LEB patients
• Outcomes of LEB after previous interventional treatment
• MI rates in diabetics after LEB
• Clinical improvement vs. graft patency in LEB
• Impact of increased beta blocker usage
• Statin use working group report
• New QI projects and clinical uses for registry
• Variation in complication rates by center and procedure
VSGNE 2003
9 Participating Hospitals

- Dartmouth-Hitchcock Medical Center
- Fletcher Allen Health Care
- Catholic Medical Center
- Lakes Region Hospital
- Dartmouth-Hitchcock Medical Center
- Cottage Hospital
- Central Maine Medical Center
- Eastern Maine Medical Center
- Concord Hospital
- Maine Medical Center
VSGNE 2010
22 Participating Hospitals

Fletcher Allen Health Care
Dartmouth-Hitchcock Medical Center
Eastern Maine Medical Center
Maine General Medical Center

Rutland Regional Medical Center
Cottage Hospital
Lakes Region Hospital

Catholic Medical Center
Central Maine Medical Center
Maine Medical Center
Mercy Hospital
Concord Hospital

Berkshire Medical Center
Catholic Medical Center
U. Mass. Medical Center
Baystate Medical Center
Elliot Hospital
Tufts Medical Center

St. Francis Hospital
Boston Medical Center

Yale-New Haven Hospital
Caritas St. Anne’s Hospital
Massachusetts General Hospital

VSGNE 2010
22 Participating Hospitals
VSGNE 2010
22 Participating Hospitals

12 Community - 10 Academic
25 – 950 Hospital Beds

“Real World Practice”
>14,000 Operations Reported

CEA, CAS, AAA, LEB (2003-2010)

Power Lies in Data
Accumulated Over Time
Quality Improvement

- Can feedback with anonymous benchmarking influence individual surgeon practice?
- Can we manage what we measure?
- Can we generate new knowledge?
Process of Surgical Care

- Patient selection for treatment
- Pre-operative evaluation
- Medical risk reduction
- Operation selection (endo vs. open)
- Operation
- Post-operative care
- Post-discharge care
- Long-term follow-up care
Predicting Cardiac Complications

- In-hospital MI, CHF, serious arrhythmia

- 9,809 VSGNE patients: 6.5%

  - CEA: 3.0%
  - EVAR: 4.7%
  - LEB: 8.4%
  - oAAA: 20.2%

-Bertges et al, J Vasc Surg, 2010
Predicting Cardiac Complications

- MI, CHF, arrhythmia
- Revised Cardiac Risk Index – 6 factors:
  - CAD, CHF, IDDM, CVA, creat > 2, high risk surgery
  - Only 20% of operations in derivation set were vascular

<table>
<thead>
<tr>
<th>Number of RCRI Risk Factors</th>
<th>RCRI Predicted Risk (%)</th>
</tr>
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<tbody>
<tr>
<td>0</td>
<td>0.4</td>
</tr>
<tr>
<td>1</td>
<td>0.9</td>
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<tr>
<td>2</td>
<td>6.6</td>
</tr>
<tr>
<td>≥ 3</td>
<td>11.0</td>
</tr>
</tbody>
</table>

-Bertges et al, J Vasc Surg, 2010
Predicting Cardiac Complications

- MI, CHF, arrhythmia

- Revised Cardiac Risk Index – 6 factors:
  - CAD, CHF, IDDM, CVA, creat > 2, high risk surgery
  - Only 20% of operations in derivation set were vascular

- Underestimates risk in vascular surgery patients in VSGNE

<table>
<thead>
<tr>
<th>Number of RCRI Risk Factors</th>
<th>RCRI Predicted Risk (%)</th>
<th>VSGNE Actual Event Rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.4</td>
<td>2.6</td>
</tr>
<tr>
<td>1</td>
<td>0.9</td>
<td>6.7</td>
</tr>
<tr>
<td>2</td>
<td>6.6</td>
<td>11.6</td>
</tr>
<tr>
<td>≥ 3</td>
<td>11.0</td>
<td>18.4</td>
</tr>
</tbody>
</table>

-Bertges et al, J Vasc Surg, 2010
More Risk Predictors in VSGNE

Impact of each factor varies somewhat for each type of operation

-Bertges et al, J Vasc Surg, 2010
VASCULAR STUDY GROUP OF NEW ENGLAND

Predicting Cardiac Events
MI, CHF, arrhythmia
Operation specific risk predictor: CEA

This model predicts risk of in-hospital major cardiac event (MI, clinically significant arrhythmia, or CHF) for Carotid Endarterectomy procedures.

<table>
<thead>
<tr>
<th>Factor</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes</td>
<td>Non-insulin Dependent</td>
</tr>
<tr>
<td>CAD [Definition]</td>
<td>Yes</td>
</tr>
<tr>
<td>CABG/PCI [Definition]</td>
<td>Yes</td>
</tr>
<tr>
<td>CHF [Definition]</td>
<td>Yes</td>
</tr>
<tr>
<td>Cardiac Stress Test [Definition]</td>
<td>Not Done</td>
</tr>
<tr>
<td>Aspirin [Definition]</td>
<td>Yes</td>
</tr>
<tr>
<td>Clopidogrel (Plavix) [Definition]</td>
<td>No</td>
</tr>
<tr>
<td>Statin [Definition]</td>
<td>No</td>
</tr>
<tr>
<td>Prior Vascular Surgery [Definition]</td>
<td>Yes</td>
</tr>
</tbody>
</table>

Prediction
Risk of In-hospital Major Cardiac Event
(MI, clinically significant arrhythmia, or CHF)
0% 11.2% 100%

www.vsgne.org
Predicting Cardiac Events

MI, CHF, arrhythmia

Operation specific risk predictor: LEB

www.vsgne.org
Process of Surgical Care

- Patient selection for treatment
- Pre-operative evaluation
- Medical risk reduction
- Operation selection (endo vs. open)
- Operation
- Post-operative care
- Post-discharge care
- Long-term follow-up care
Medical Risk Reduction

- **Statin treatment pre-operatively**
  - Discussed evidence for benefit at semi-annual meetings
  - Selected as a quality measure for anonymous benchmarking
  - Developed letters to PCPs asking them to start statins
  - Reported results to centers and surgeons
Pre-op Statin Use 2003

Initial 25 Surgeons
Pre-op Statin Use 2009

Initial 25 Surgeons
Pre-op Statin Use 2009

49 Current Surgeons
Pre-op Statin Use

Developed Request Letters to PCPs

Set 90% Target
Process of Surgical Care

- Patient selection for treatment
- Pre-operative evaluation
- Medical risk reduction
- Operation selection (endo vs. open)
- Operation
- Post-operative care
- Post-discharge care
- Long-term follow-up care
Operative Process Improvement

- Patching conventional CEA
  - Discussed evidence for benefit at semi-annual meeting
  - Selected as a quality measure for anonymous benchmarking
  - Reported results to centers and surgeons
3,427 CEAs in 3,304 Patients
>80% Stenosis at One Year

Patch:
3-Fold Reduction
\( p=0.001 \)

Multivariate Predictor of 80-100% Stenosis

- Goodney et al, SAVS 2010
Percentage of Patients Not Patched Decreased over Time

- Conventional CEA without Patch

p<0.003

- Goodney et al, SAVS 2010
One Year Stenosis Rate Also Decreased over Time

Process Improvement → Outcome Improvement

- Goodney et al, SAVS 2010
Learning from Infrequent Events

- **Carotid endarterectomy**
  - In hospital stroke or death – 0.9%
  - Re-operation for bleeding – 1.2%

- **Surgeon volume:**
  - 25 CEAs per year:
    - 1 stroke or reoperation every 4 years
  - 100 CEAs per year:
    - 1 stroke or reoperation every year

- **Impossible to recognize any pattern!**
  - Can’t “learn from mistakes”
Predictors of Stroke/Death after CEA
3000 Patients in VSGNE

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Odds Ratio</th>
</tr>
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<tbody>
<tr>
<td>Contralateral occlusion</td>
<td>3.2</td>
</tr>
<tr>
<td>Age &gt;70</td>
<td>2.5</td>
</tr>
<tr>
<td>Symptomatic status</td>
<td>2.4</td>
</tr>
<tr>
<td>Aspirin or plavix use</td>
<td>0.4</td>
</tr>
</tbody>
</table>

- Only age available in admin data sets

Risk Adjusted Outcome Reports

Observed/Expected Ratio for Stroke or Death after CEA by Medical Center

5126 VSGNNE Carotid Endarterectomies 2003 to 2008

- More strokes/deaths than expected
- Operating as expected
- Fewer strokes/deaths than expected

Regional mean O/E ratio - 1.009

* p < .05 versus region and expected
# No observed strokes/deaths

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CEA Re-operation for Bleeding

- Re-operation for bleeding: 1.2%
- Does protamine reduce re-operation for bleeding after CEA?
- N= 4587 CEAs in VSGNE

-Stone et al, J Vasc Surg, 2010
VSGNE Surgeon Practice

4587 Total CEAs

Protamine

2087 (46%)

No Protamine

2500 (54%)

- Stone et al, J Vasc Surg, 2010
Reoperation for Bleeding

**Patients**

<table>
<thead>
<tr>
<th></th>
<th>% Patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protamine</td>
<td>0.6%</td>
</tr>
<tr>
<td>No Protamine</td>
<td>1.7%</td>
</tr>
</tbody>
</table>

*P=0.001

N=14, N=42

-Stone et al, J Vasc Surg, 2010
Thrombotic Complications

*P=NS

- Stone et al, J Vasc Surg, 2010

<table>
<thead>
<tr>
<th>Condition</th>
<th>Protamine</th>
<th>No Protamine</th>
</tr>
</thead>
<tbody>
<tr>
<td>MI</td>
<td>1.1</td>
<td>0.91</td>
</tr>
<tr>
<td>Stroke</td>
<td>0.78</td>
<td>1.15</td>
</tr>
<tr>
<td>Death</td>
<td>0.23</td>
<td>0.32</td>
</tr>
</tbody>
</table>

- Stone et al, J Vasc Surg, 2010
Value of a Detailed Clinical Registry

- Only a very large registry with detailed clinical information could answer a question where the event rate is low.
  - Clinical trial too expensive
  - Administrative databases lack clinical detail

- This finding is expected to increase protamine use in our region since it has now been made a quality measure.
VSGNE- Lessons Learned

- Many registries have failed
  - Failure to add value to clinician, hospital

- Benchmarked reports important
  - Stimulates improvement
  - Valuable to hospitals and clinicians

- Regional group meetings promote QI
  - Maintain momentum, enthusiasm
  - Develop group trust, cooperative projects

- Research is an important derivative
  - Stimulates academic center participation
Cooperative Regional Groups

**Vision:**
- Regional groups for local control, data ownership and responsibility
- National network to allow regional groups to share common data elements

**Grp A**  **Grp B**  **Grp C**  **Grp D**  **Grp E**

**Mechanism for Data Sharing Among Regional Groups**
Patient Safety Act of 2009

- Established a mechanism by which hospitals and providers may voluntarily report data to Patient Safety Organizations (PSOs), on a privileged and confidential basis, for the aggregation and analysis of patient safety events.
- Protects work product from discovery
- Eliminates need for informed consent
- Allows patient identifiers to be included
Vascular Study Group PSO

- Accredited by AHRQ in Dec, 2009

- Executive Committee
  - One representative from each region
  - Oversee common data elements, data sharing between regions

- Regional Quality Committees
  - Regional analyses, quality reports
  - New England, Carolinas, Florida, Texas, California, Ontario
VSG PSO Rules

- Use common data elements
- All consecutive procedures
- Claims-based data audit
- One year follow-up
- Anonymous benchmarking
- Each center owns their data
- Not to use data for comparative marketing
Data System Requirement

- **Efficient data entry**
  - Web-based, drop down menus
  - Segments for entry by different personnel
  - Error trapping at time of entry
  - System to track needed 1 year follow-up

- **Real time report generation**
  - Customized reports of key quality measures
Demographic Data Entry - Nurse

<table>
<thead>
<tr>
<th>Demographic Information</th>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Smoking</strong></td>
<td>Prior (&gt;1yr)</td>
</tr>
<tr>
<td><strong>Diabetes</strong></td>
<td>Oral Meds</td>
</tr>
<tr>
<td><strong>CAD Symptoms</strong></td>
<td>hx MI but no sx</td>
</tr>
<tr>
<td><strong>CHF</strong></td>
<td>None</td>
</tr>
<tr>
<td><strong>Dialysis</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Stress Test</strong></td>
<td>Not done</td>
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<tr>
<td><strong>ASA Class</strong></td>
<td>3</td>
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<table>
<thead>
<tr>
<th><strong>Previous Arterial</strong></th>
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<tbody>
<tr>
<td><strong>Bypass</strong></td>
<td>Yes</td>
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<tr>
<td><strong>Aneur Repair</strong></td>
<td>No</td>
</tr>
<tr>
<td><strong>Major Amp</strong></td>
<td>No</td>
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</table>

<table>
<thead>
<tr>
<th><strong>Pre-Op Medications</strong></th>
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</thead>
<tbody>
<tr>
<td><strong>ASA</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Statin</strong></td>
<td>Yes</td>
</tr>
</tbody>
</table>

| **Hypertension**                      | Yes    |
| **Beta Blockers**                     | Peri-Operative |
| **CABG / PTCA**                       | None   |
| **COPD**                              | Not treated |

| **Creatinine**                        | 1.0 mg/dl |
| **Pre-adm Living**                    | Home     |
| **Pre-op Hemoglobin**                 | 12 g/dl   |

| **CEA**                               | No      |
| **PTA/Stent**                         | No      |
| **Plavix**                            | No      |
## Operative Data Entry - Surgeon

### Procedure Information

<table>
<thead>
<tr>
<th>Field</th>
<th>Value</th>
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<tbody>
<tr>
<td>Urgency</td>
<td>Elective</td>
</tr>
<tr>
<td>Side</td>
<td>Right</td>
</tr>
<tr>
<td>Patch</td>
<td>Bovine pericardium</td>
</tr>
<tr>
<td>Heparin</td>
<td>Yes</td>
</tr>
<tr>
<td>Re-explore artery after closure?</td>
<td>No</td>
</tr>
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<td>Anesthesia Type</td>
<td>General</td>
</tr>
<tr>
<td>Anesthesia Type</td>
<td>Conventional</td>
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<tr>
<td>Shunt</td>
<td>Yes (routine)</td>
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<tr>
<td>Protamine</td>
<td>Yes</td>
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<tr>
<td>Dextran</td>
<td>No</td>
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<tr>
<td>Monitoring:</td>
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<tr>
<td>Awake</td>
<td>No</td>
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<tr>
<td>Stump Pressure</td>
<td>No</td>
</tr>
<tr>
<td>Heart Rate:</td>
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<td>On Arrival in OR</td>
<td>72 bpm</td>
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<td>Highest intra-op</td>
<td>80 bpm</td>
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<td>Completion:</td>
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<tr>
<td>Doppler</td>
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<td>Angiogram</td>
<td>No</td>
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<td>Concomitant Procedure:</td>
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<td>CABG</td>
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<td>Other Arterial Op</td>
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<tr>
<td>Duplex</td>
<td>Yes</td>
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<td>Flowprobe</td>
<td>No</td>
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<td>Proximal Endovasc</td>
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### Post-op Data Entry - Nurse

**Post-Op Information**

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<tr>
<th>Cranial Nerve Injury:</th>
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<tr>
<td>VII</td>
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<tr>
<td>X</td>
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<tr>
<td>Other</td>
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<thead>
<tr>
<th>Ipsilateral Neurologic Event</th>
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<tbody>
<tr>
<td>Contralateral Neurologic Event</td>
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</table>

<table>
<thead>
<tr>
<th>IV Med Required for:</th>
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<tbody>
<tr>
<td>Hypertension</td>
<td>No</td>
</tr>
<tr>
<td>Complications:</td>
<td></td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>No</td>
</tr>
<tr>
<td>CHF</td>
<td>No</td>
</tr>
<tr>
<td>Reperfusion Symptoms</td>
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<table>
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<tr>
<th>Discharge Medications:</th>
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<tbody>
<tr>
<td>ASA</td>
<td>Yes</td>
</tr>
<tr>
<td>Other Antiplatelet</td>
<td>No</td>
</tr>
<tr>
<td>Beta Blocker</td>
<td>Yes</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Peri-Op Antibiotic Ordered?:</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Start &lt;1 hr Pre-op</td>
<td>Yes</td>
</tr>
<tr>
<td>1st-2nd Gen Cephalosporin</td>
<td>Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time of Onset</th>
<th>&lt; 6 hrs post-op</th>
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<tbody>
<tr>
<td>Hypotension</td>
<td>Yes</td>
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<tr>
<td>Dysrhythmia (new)</td>
<td>No</td>
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<tr>
<td>Wound Infection</td>
<td>No</td>
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<tr>
<td>Return to OR</td>
<td>No</td>
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<td>Plavix</td>
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<td>Statin</td>
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<th>Stop &lt;24 hr Post-op</th>
<th>No for medical reason</th>
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</table>
Customized Reports for Surgeons

Select Complications to Include:

- Wound Infection
- Graft Infection
- Bleeding
- Transfusion # units PRBC
- Myocardial Infarction
- Dysrhythmia
- CHF
- Respiratory
- Change of renal function
- Return to OR

LEB Post-OP Complications by Surgeon
Arranged by Increasing Annual Rate of Procedure
n=3379
Select Patient Sub-Categories

Mortality or Major Amputation after Lower Extremity Bypass:
Include: Diabetes, dialysis, pre-adm living, statin use, indication, pathology, ambulation pre-op, prosthetic vs. autogenous graft status
Regional Quality Improvement

- **VSGNE demonstrates feasibility**
  - Audited data with one year follow-up
- **Goal:** Encourage others to duplicate
  - Each region with ownership and control of their data and QI process
- **Share data among regions via PSO**
  - Use shared data for benchmarking, risk adjustment and QI research
  - Regional representatives to the PSO regulate data sharing and use
- **National network of QI registries**
What is the Role of Vascular Surgeons in Quality Improvement?
What is the Role of Vascular Surgeons in Quality Improvement?

- **Embrace surgical quality improvement**
  - Become a vocal champion
  - All processes of care, not just operation
What is the Role of Vascular Surgeons in Quality Improvement?

- Embrace surgical quality improvement
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- Join the Vascular Study Group of NE
  - Successful regional group
  - “Measure to manage”
What is the Role of Vascular Surgeons in Quality Improvement?

- Embrace surgical quality improvement
  - Become a vocal champion
  - All processes of care, not just operation

- Join the Vascular Study Group of NE
  - Successful regional group
  - “Measure to manage”

- If we don’t manage QI, government will.
Acknowledgments

- **O’Connor GT.** Regional organization for outcomes research. Annals NY Acad Sci 1993
<table>
<thead>
<tr>
<th>State</th>
<th>Medical Centers</th>
<th>Physicians</th>
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<tbody>
<tr>
<td>Maine</td>
<td>Central Maine Medical Center, Lewiston</td>
<td>Pietro Guadalupe, MD Allan M. Ingraham, MD Mark Lanzieri, MD Steven Levin, MD Pamela R. Rietschel, MD Sarat Vaddineni, MD</td>
</tr>
<tr>
<td></td>
<td>Eastern Maine Medical Center, Bangor</td>
<td>Robert A. Cambria, MD Robert A. Clough, MD Charles E. Dixon, MD Larry D. Flanagan, MD Lisa Floyd, MD Terrance K. Fournier, MD John W. Hallett, MD Felix Hernandez, Jr., MD Dennis Ng, MD Andrew Sherwood, MD Peter Ver Lee, MD</td>
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<td></td>
<td>Maine General Medical Center, Augusta, ME</td>
<td>Christobal G. Alvarado, MD Mark E. Bolduc, MD</td>
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<td></td>
<td>Maine Medical Center, Portland</td>
<td>Georges S. Abourjaily, MD Christopher Baker, MD Paul H.S. Bloch, MD Scott A. Buchanan, MD David Burkey, MD David Butzel, MD Rajiv Desai, MD Jeffrey E. Florman, MD Neal C. Hadro, MD Robert Hawkins, MD Christopher Healey, MD William E. Herbert, MD Peter Higgins, MD Douglas L. Jicha, MD Jens Eldrup-Jorgensen, MD Usman Nasir-Khan, MD Eddie Kwan, MD Walter Keller, DO John Wahlig, MD</td>
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<td>Mercy Hospital, Portland</td>
<td>Paul H.S. Bloch, MD Robert Hawkins, MD Christopher Healey, MD William E. Herbert, MD Jens Eldrup-Jorgensen, MD</td>
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<td>New Hampshire</td>
<td>Catholic Medical Center, Manchester</td>
<td>Yvon Barbeau, MD David Charlesworth, MD William Clutterbuck, MD Patricia Curey, MD Patrick A. Mahon, MD Benjamin M. Westbrook, MD</td>
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<td>Concord Hospital, Concord</td>
<td>Eric Leefmans, MD Joseph P. Meyer, MD Richard Murphy, MD Seth Resnicoff, MD William Tanski, MD</td>
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<td>Cottage Hospital, Woodsville</td>
<td>Christopher S. Danielson, DO Kenneth S. Danielson, MD</td>
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<td>Dartmouth-Hitchcock Med Ctr, Lebanon</td>
<td>Christopher Alessi, MD Jack L. Cronenwett, MD Mark F. Fillinger, MD Philip P. Goodney, MD Brian W. Nolan, MD Richard J. Powell, MD Eva M. Ruzcidlo, MD Marc C. Schermerhorn, MD David Stone, MD Daniel B. Walsh, MD Mark C. Wyers, MD Robert M. Zvolak, MD</td>
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<td>Elliot Hospital, Manchester</td>
<td>Larry Hoepf, MD William Wilson, MD</td>
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<td>Lakes Region General Hospital, Laconia</td>
<td>Samuel C. Aldridge, MD Robert Anderson, MD Glenn Fusonie, MD John H. Vignati, MD</td>
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<td>Vermont</td>
<td>Fletcher Allen Health Care, Burlington</td>
<td>David Pilcher, MD Todd Peebles, MD Michael Ricci, MD Andrew C. Stanley, MD Georg Steinthorsson, MD Steven R. Shackford, MD</td>
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<td>Matthew Conway, MD J. Christian Higgins, MD Baxter Holland, MD Brad Jimmo, MD John Louras, MD Victor Pisanelli, MD</td>
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<td>St. Francis Hospital, Hartford</td>
<td>Scott Fecteau, MD Steven Ruby, MD Eugene D. Sullivan MD</td>
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<td>Yale New Haven Hospital, New Haven</td>
<td>Melih Arici, MD John Aruny, MD Jeptha Curtis, MD Alan Dardik, MD Ralph DeNatale, MD John Forrest, MD Richard Gusberg, MD Faisal Hasan, MD Jeffrey Hnath, MD Jeffrey Indes, MD Carlos Mena, MD Hamid Mojibian, MD Bart Muhs, MD</td>
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