Experience of a Registry-Based PSO in Creating Center Specific Reports to Identify Opportunities for Improvement

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The opinions expressed in this presentation are those of the presenter and do not reflect the official position of the Department of Health and Human Services (HHS), the Agency for Healthcare Research and Quality, or the Office for Civil Rights.
Listed by AHRQ Feb, 2011

- Registry-based data collection
- Major vascular procedures
  - Patient characteristics
  - Processes of care
  - Outcomes
- In hospital and 1 year follow-up
- Audited against claims data
16 Regional Quality Groups

Semi-annual meetings, discuss regional variation, develop QI projects
Vascular Quality Initiative: SVS PSO + Regional Groups

- Provides power of large, national database
  - Risk-adjustment, identification of best practices
  - Anonymous benchmarking: centers & physicians

- Regional ownership and quality improvement
  - Smaller groups, semi-annual meetings
  - Ownership and trust of the data and process
  - Collaboration on regional quality projects
Regional Quality Improvement

- Increased use of desired pre-op medications
  - Statins and anti-platelet agents
- Use of protamine during carotid surgery
  - Reduced reoperation for bleeding by 50%
- More accurate cardiac risk prediction tool
  - Better patient selection; smartphone app

- Surgical Site Infection (SSI) after Leg Bypass
In-hospital SSI after Lower Extremity Bypass

Surgical Site Infection Rate after Lower Extremity Bypass

Observed and Expected by VQI Centers
3,615 patient procedures January 2010 to June 2012

* Significantly higher than expected (p-value < 0.05)
Chi-square test
Surgical Site Infection (SSI) after Lower Extremity Bypass

- Associated with long LOS, high cost
- Multivariate predictors of SSI:
  - Longer operation, more transfusion
  - Chlorhexidine skin prep → reduced infection rate by 50%!

- How to effect change at individual centers?
COPI Reports

- **Center Opportunity Profile for Improvement**
- Unique report for each center:
  - Their SSI rate after lower extremity bypass
  - How they compare to other centers regarding potentially modifiable risk factors that affect SSI:
    - Skin prep with chlorhexidine
    - Transfusion $\geq$ 3 units packed red blood cells
    - Operation time $>$ 220 minutes
COPI Report for SSI after Lower Extremity Bypass

### COPI

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

<table>
<thead>
<tr>
<th></th>
<th>VQI Average</th>
<th>Your Center</th>
</tr>
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<tbody>
<tr>
<td>Chlorhexidine</td>
<td>79%</td>
<td></td>
</tr>
<tr>
<td>Transfusion &lt; 3</td>
<td>85%</td>
<td></td>
</tr>
<tr>
<td>Units &lt; 220</td>
<td></td>
<td></td>
</tr>
<tr>
<td>minutes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Higher is better</td>
<td></td>
<td>Improvement Opportunity</td>
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- Switch to Chlorhexidine. Reduce number of transfusions.
COPI Report for SSI after Lower Extremity Bypass

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### Predictors of Wound Infection

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<tr>
<td>Your center</td>
<td>32%</td>
<td>60%</td>
<td>49%</td>
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Switch to Chlorhexidine. Reduce number of transfusions.
# COPI Report for SSI after Lower Extremity Bypass

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- **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 < 0.05

**Improvement Opportunity:**
- Switch to Chlorhexidine.
- Reduce number of transfusions.
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**Predictors of wound infection**

- **Higher is better**
  - Chlorhexidine: 79%
  - Transfusion < 3 Units: 85%
  - Procedure time < 220 minutes: 50%

**Your Center**

- Improvement Opportunity

- Switch to Chlorhexidine. Reduce number of transfusions.
COPI Report for SSI after Lower Extremity Bypass

- COPI reports mailed to all centers in December, 2012

- Questions:
  - Would this information, in this format, change practice patterns?
  - Which factors could/would be changed?
Procedure Time < 220 Minutes

Percentage

COPI Report
Transfusion < 3 Units PRBC
Chlorhexidine Skin Prep Use

Percentage

1/2/12 2/2/12 3/2/12 4/2/12 5/2/12 6/2/12 7/2/12 8/2/12 9/2/12 10/2/12 11/2/12 12/2/12 1/2/13 2/2/13 3/2/13 4/2/13 5/2/13 6/2/13 7/2/13 8/2/13 9/2/13 10/2/13 11/2/13 12/2/13

93% 79%

COPI Report
SSI Rate after Lower Extremity Bypass

Percentage


COPI Report

3.8%
Center Use of Chlorhexidine

- Chlorhexidine usage from 2012 to 2013

- No Change, Routine Use, 61%
- Increased to Routine Use, 29%
- No Change, Selective Use, 10%

(Routine Use = at least 80% of cases)
Centers with Improvement to Routine Chlorhexidine Use

**Chlorhexidine Use**
- 2011: 10%
- 2013: 90%

**Infection Rate**
- 2011: 6%
- 2013: 1%
Summary SSI COPI Report

- COPI report proved to be an effective means to share center-level results
  - 75% of centers that rarely or selectively used chlorhexidine improved to routine use

- Centers that improved chlorhexidine usage had a reduction of in-hospital SSI
  - Improved quality of care
  - Reduced cost
Length of Stay after Elective Carotid Endarterectomy

Percent of Patients with Length of Stay > 1 day after Elective Carotid Endarterectomy (post-procedure to discharge) 2011-2013

VQI Centers

Observed  Expected
Carotid Endarterectomy Length of Stay COPI Report

Your center’s average and median LOS after isolated elective CEA, with standard deviation, are shown in the table below, and compared with all centers in VQL. In addition, your center’s observed and expected percentage of patients with LOS > 1 day are shown, with a statistical calculation of whether this percentage is lower or higher than expected based on the characteristics of patients in your center.

The line graph below shows the percentage of patients with LOS > 1 day after isolated elective CEA in your center over time, compared with all VQL centers, while the bar graph shows the actual distribution of LOS in your center compared to all VQL centers.

Percent of Patients with LOS > 1 day per Quarter for Your Center and VQL

71% of patients have a one day post-LOS after elective, isolated CEA.
Carotid Endarterectomy Length of Stay COPII Report

<table>
<thead>
<tr>
<th></th>
<th>Your center</th>
<th>VQI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of procedures</td>
<td>145</td>
<td>11,906</td>
</tr>
<tr>
<td>Length of stay (days)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>2.0</td>
<td>1.7</td>
</tr>
<tr>
<td>Standard deviation</td>
<td>1.7</td>
<td>5.4</td>
</tr>
<tr>
<td>Median</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>% LOS &gt; 1 day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Observed</td>
<td>54%</td>
<td></td>
</tr>
<tr>
<td>Expected</td>
<td>36%</td>
<td></td>
</tr>
</tbody>
</table>

Observed statistically significant from Expected:

Green observed lower than expected
Red observed higher than expected

p<0.01
Multivariable analysis of factors associated with LOS > 1 day post procedure:
- Patient characteristics
- Procedure details
- Post-op complications
- Annual surgeon volume
Carotid Endarterectomy Length of Stay COPI Report

- **Patient Characteristics**
  - Not modifiable, but could be used to focus discharge planning prior to procedure

- **Procedure Details**
  - Could be modified or investigated to improve current practice

- **Post-op Complications**
  - Key opportunities to investigate and improve to reduce LOS

- **Surgeon Volume**
  - Opportunity to change practice of low volume surgeons
## Opportunity for Improvement

<table>
<thead>
<tr>
<th>Risk factors for LOS &gt; 1 day</th>
<th>Odds Ratio</th>
<th>% patients at Your Center with risk factor</th>
<th>VQI Overall rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Procedure details</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Anesthesia Type - General Anesthesia</td>
<td>1.9</td>
<td>99%</td>
<td>91%</td>
</tr>
<tr>
<td>IV Med Required for Hypertension</td>
<td>2.9</td>
<td>22%</td>
<td>16%</td>
</tr>
<tr>
<td>IV Med Required for Hypotension</td>
<td>3.4</td>
<td>29%</td>
<td>10%</td>
</tr>
<tr>
<td>Post-op complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Any Cranial Nerve Injury</td>
<td>1.6</td>
<td>6.9%</td>
<td>3.3%</td>
</tr>
<tr>
<td>Any Neurologic Event</td>
<td>9.3</td>
<td>2.8%</td>
<td>1.2%</td>
</tr>
<tr>
<td>Reperfusion Symptoms</td>
<td>4.8</td>
<td>0.0%</td>
<td>0.1%</td>
</tr>
<tr>
<td>Myocardial Infarction</td>
<td>24.9</td>
<td>2.8%</td>
<td>1.0%</td>
</tr>
<tr>
<td>Dysrhythmia</td>
<td>6.1</td>
<td>1.4%</td>
<td>1.6%</td>
</tr>
<tr>
<td>Post-op Congestive Heart Failure</td>
<td>8.3</td>
<td>0.7%</td>
<td>0.6%</td>
</tr>
<tr>
<td>Return to OR - Bleeding/Other</td>
<td>7.2</td>
<td>1.4%</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

### Annualized VQI Surgeon Volume*

<table>
<thead>
<tr>
<th>Procedures</th>
<th>&lt;=8</th>
<th>9 to 12</th>
<th>13 to 18</th>
<th>19 or more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>1.7</td>
<td>1.6</td>
<td>1.1</td>
<td>Reference</td>
</tr>
<tr>
<td>%</td>
<td>10%</td>
<td>11%</td>
<td>20%</td>
<td>59%</td>
</tr>
<tr>
<td>%</td>
<td>13%</td>
<td>15%</td>
<td>18%</td>
<td>54%</td>
</tr>
</tbody>
</table>
Carotid Endarterectomy Length of Stay COPI Report

- Provides centers with actionable, granular data with benchmark comparisons to others

- We expect to see reduced LOS and preserved or improved quality of care
  - Already received much positive feedback
  - Centers are anxious to receive such data
Conclusion

- A registry based PSO allows calculation of event rates and benchmarking with others
- Additional COPI reports based on member feedback are planned
  - Quality initiatives through regional groups
  - Monitor for future change
- Improve the quality and reduce the cost of vascular healthcare
Questions