OUTCOME VS PROCESS QUALITY MEASURES: WHAT IS THE DIFFERENCE AND HOW TO USE THEM

CAMERON WRIGHT, MD
DIVISION OF THORACIC SURGERY, MGH
PROFESSOR OF SURGERY, HMS
I have no disclosures
Avedis Donabedian—Father of Healthcare Quality

- Born 1919, Died 2000
- Published “Evaluating the Quality of Care” in 1966—considered the founding paper in quality
- Promulgated a triad to measure quality of care
  - **Structure**—how was care organized
  - **Process**—what was done
  - **Outcome**—what happened to the patient
Structural Measures

- **Advantages**
  - May be highly relevant in a complex health system
  - Usually easy to measure
  - Often easy for the patient to understand

- **Disadvantages**
  - Fails to capture the quality of care of an individual physician
  - Difficult to determine the gold standard
  - Often just a baseline for ability to deliver quality care

- **Examples**
  - 24 hour attending intensivist, hospital performs > 10 esophagectomies/year, there is a multimodality cancer conference, hospital uses computer order entry
Process Measures

• **Advantages**
  - Easily measured and acted upon
  - May not require case-mix adjustment
  - May directly reflect quality
  - No time lag for measurement

• **Disadvantages**
  - A proxy for outcomes
  - Difficult to agree on gold standard processes
  - May promote “cookbook” medicine and gaming of the system

Examples - Antibiotics given prior to skin incision, checking the Hb A1c in a diabetic patient, ordering LMWH for DVT prophylaxis
Outcome Measures

• **Advantages**
  – What we really care about
  – But outcomes do not measure what happened along the care path
  – The patient often has a different perception of outcome than the physician

**Disadvantages**

– May take years to occur, collect and report
– May not reflect the true quality of care
– Requires case mix adjustment to allow proper comparisons

Examples-Length of stay, readmission rate, 30 day mortality, risk-adjusted morbidity or mortality
STS GTDB NQF Measures

- 456-Participation in a national database-structure
- 455-Recording clinical stage prior to surgery for lung cancer or esophageal cancer-process
- 457-Recording of performance status prior to lung or esophageal cancer resection-process
• 460-Risk-adjusted morbidity and mortality for esophagectomy for cancer-outcome

• 1790-Risk-adjusted morbidity and mortality for lung resection for lung cancer-outcome

• 459-Risk adjusted morbidity: Length of stay > 14 days after lobectomy for lung cancer-outcome
Table 9: Combined Morbidity/Mortality for Esophagectomy Details, Last 3 Years, Jul 2011 - Jun 2014

<table>
<thead>
<tr>
<th>Detail</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
</tr>
<tr>
<td>Eligible Procedures</td>
<td>174</td>
</tr>
<tr>
<td>Combined Morbidity/Mortality(^1)</td>
<td>19</td>
</tr>
<tr>
<td>Bleeding Req. Reoperation(^2)</td>
<td>0</td>
</tr>
<tr>
<td>Anastomosis Leak Req. Medical Rx only(^2)</td>
<td>1</td>
</tr>
<tr>
<td>Anastomotic Leak Req. Surgical Intervention(^2)</td>
<td>3</td>
</tr>
<tr>
<td>Reintubation(^2)</td>
<td>10</td>
</tr>
<tr>
<td>Initial Vent Support &gt; 48hrs(^2)</td>
<td>0</td>
</tr>
<tr>
<td>Pneumonia(^2)</td>
<td>11</td>
</tr>
<tr>
<td>Discharge Mortality(^2)</td>
<td>0</td>
</tr>
</tbody>
</table>

\(^1\) Percentage represents the proportion of the entire eligible model population

\(^2\) Percentage represents the proportion contributed to the total number of patients with a morbidit/mortality

Figure 9: Combined Morbidity/Mortality for Esophagectomy, Last 3 Years, Jul 2011 - Jun 2014

<table>
<thead>
<tr>
<th>Eligible Procedures</th>
<th>Unadjusted Rate</th>
<th>Risk-Adjusted Rate (95% CI)</th>
<th>Standardized Incidence Ratio (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>174</td>
<td>10.9%</td>
<td>14.5% (9.9% , 19.9%)</td>
<td>0.52 (0.36 , 0.72)</td>
</tr>
</tbody>
</table>

Distribution of Participant Values

\(\bullet\) = STS Standardized Incidence Ratio

Min 0.52
25th 0.94
Median 1.04
75th 1.17
Max 1.81

Note: Refer to the Report Overview for details on combined morbidity/mortality for esophagectomy risk-adjustment methodology.
### Table 6: Participant Performance for Lobectomy Compared to STS and NIS Databases

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discharge Mortality</strong></td>
<td>n=544 Percent (95% CI) 3/544=0.6% (0.1, 1.6)</td>
<td>n=20,777 Percent 20/20777=1.0%</td>
<td>n=26,015 Percent 460/26015=1.8%</td>
</tr>
<tr>
<td></td>
<td><img src="image1" alt="Participant" /> <img src="image2" alt="STS" /> <img src="image3" alt="NIS" /></td>
<td><img src="image4" alt="STS" /> <img src="image5" alt="NIS" /></td>
<td></td>
</tr>
<tr>
<td><strong>Postoperative Length of Stay (Days)</strong></td>
<td>n=544 Mean (95% CI) 5.6 (5.2, 6.0)</td>
<td>n=20,753 Mean 5.9</td>
<td>n=26,015 Mean 7.3</td>
</tr>
<tr>
<td></td>
<td><img src="image6" alt="Participant" /> <img src="image7" alt="STS" /> <img src="image8" alt="NIS" /></td>
<td><img src="image9" alt="STS" /> <img src="image10" alt="NIS" /></td>
<td></td>
</tr>
<tr>
<td><strong>Minimally Invasive Lobectomy for Clinical Stage I Lung Cancer</strong></td>
<td>n=431 Percent (95% CI) 269/431=62.4% (57.7, 67.0)</td>
<td>n=15,869 Percent 10112/15869=63.7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td><img src="image11" alt="Participant" /> <img src="image12" alt="STS" /></td>
<td><img src="image13" alt="STS" /></td>
<td></td>
</tr>
</tbody>
</table>

1 Refer to the Report Overview for the Lobectomy Population inclusion details
2 Computed time between the surgery date and discharge date
# STS Lobectomy Model Composite Measure-Outcomes

## Table 7: Lobectomy for Lung Cancer Composite Quality Rating

<table>
<thead>
<tr>
<th>Quality Domain</th>
<th>Participant Score (95% CI)</th>
<th>STS Mean Participant Score</th>
<th>Participant Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul 2011 - Jun 2014 Overall</td>
<td>96.9% (95.80, 97.82)</td>
<td>96.7%</td>
<td>⭐⭐</td>
</tr>
<tr>
<td>Jul 2011 - Jun 2014 Absence of Mortality</td>
<td>98.3% (97.00, 98.13)</td>
<td>98.4%</td>
<td>⭐⭐</td>
</tr>
<tr>
<td>Jul 2011 - Jun 2014 Absence of Major Complication</td>
<td>90.9% (88.10, 93.19)</td>
<td>89.9%</td>
<td>⭐⭐</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Eligible Procedures</th>
<th>Detail</th>
<th>Count</th>
<th>Percent²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jul 2011 - Jun 2014 Absence of Mortality</td>
<td>Mortality</td>
<td>536</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Pneumonia</td>
<td>10</td>
<td>27.8%</td>
</tr>
<tr>
<td></td>
<td>ARDS</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Bronchopleural Fistula</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Pulmonary Embolus</td>
<td>3</td>
<td>8.3%</td>
</tr>
<tr>
<td></td>
<td>Initial Vent Support &gt;48hrs</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Reintubation</td>
<td>2</td>
<td>5.6%</td>
</tr>
<tr>
<td></td>
<td>Tracheostomy</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td></td>
<td>Myocardial Infarction</td>
<td>1</td>
<td>2.6%</td>
</tr>
<tr>
<td></td>
<td>Unexpected Return to OR</td>
<td>14</td>
<td>38.9%</td>
</tr>
<tr>
<td></td>
<td>Multiple Complications (more than 1 of the above)</td>
<td>6</td>
<td>16.7%</td>
</tr>
</tbody>
</table>

² Percentages represent the proportion that the specific complication contributed to the total number of patients with a major complication.

This information is intended to facilitate and focus process and quality improvement initiatives by providers.

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* ** = Participant performance is significantly lower than the STS mean based on 97.5% Bayesian probability
* * = Participant performance is not significantly different than the STS mean based on 97.5% Bayesian probability
* * * = Participant performance is significantly higher than the STS mean based on 97.5% Bayesian probability

² Defined as one or more of any of the following: Pneumonia, acute respiratory distress syndrome, bronchopleural fistula, pulmonary embolus, initial ventilator support >48 hours, reintubation, tracheostomy, myocardial infarction, unexpected return to OR
Quality Measure Evaluation

- **Importance**
- **Scientific Soundness**
- **Usability**
- **Feasibility**

- Is a particular process related to a particular outcome?
- If there is a process-outcome relationship, what is the magnitude of the effect?
- What are the difference in outcomes with optimal performance on the process measure?
Patient Centered Care Outcomes

- A current focus of CMS, the NQF and patient advocacy groups
- To date little attention has been paid to patient reported outcomes
- Patient reported quality of life disease-specific tools (ie; St Georges Respiratory Questionnaire, Gastrointestinal Quality of Life Index) need to be incorporated into quality measurement ASAP
Surgical Readmissions- A New Quality P4P CMS Metric

- 59 K VA patients-23% complications-72% pre-discharge, 28% post-discharge. Readmission rate-12%. Only 56% were associated with a pre-discharge complication. 56% were due to infections.
- 479K Medicare patients-Readmissions associated with volume, mortality and care processes.
- 498K NSQIP patients-6% readmissions, most common SSI (20%), no time pattern to readmission

Quality-Defining the Indefinable

- What is a good surgeon?
- What is a good hospital?
- What is a good outcome?
- The eye of the beholder-is it CMS, a private payor, the hospital, the physician, or the patient

- “I know it when I see it”
Justice Potter Stewart-1964
Quality in Healthcare

- “Systems awareness and system design are important for health care professionals, but are not enough. They are enabling mechanisms only. It is the ethical dimension of individuals that is essential to a system success. Ultimately the secret of quality is love (sic-of the patient and your profession).”
Further Reading-The Best Primer for Modern Patient Safety
Question: A hospital reports a 80% VATS lobectomy rate for Stage 1 NSCLC. What type of measure is that?

A. A process measure
B. An outcome measure
Question: Which quality measure is relatively easy to measure/report?

A. A process measure
B. An outcome measure