Disclosures

- Past support from Casmed
- Research support from Covidien
"Publicity is justly commended as a remedy for social and industrial diseases. Sunlight is said to be the best of disinfectants; electric light the most efficient policeman."

Louis Brandeis: Other People’s Money, and How the Bankers Use It (1914)
Value Based Purchasing

- 1% withhold of Medicare hospital payments
- Return of portion or all of withhold, depending upon quality metrics
  - Outcome measures
  - SCIP
  - HCAHPS, including pain management
Preoperative Assessment
PONV Decision Support

Intraoperative Quality Indicators
## SCIP Adherence Infection Effect

<table>
<thead>
<tr>
<th></th>
<th>Nonadherent</th>
<th>Adherent</th>
<th>OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Infection Rate</td>
<td>N</td>
</tr>
<tr>
<td><strong>S-INF-Core: all 3 original</strong></td>
<td>44417</td>
<td>1.15%</td>
<td>154963</td>
</tr>
<tr>
<td><strong>S-INF: Full Set</strong></td>
<td>59356</td>
<td>1.42%</td>
<td>158304</td>
</tr>
</tbody>
</table>

Stulberg et al: JAMA 2010;303:2479-85
Antibiotics
Antibiotic Compliance Reminder

Antibiotic Compliance Reminder

An Anesthesia Information System Designed to Provide Physician-Specific Feedback Improves Timely Administration of Prophylactic Antibiotics

Michael O’Reilly, MD, MS*
AkkeNeel Talsma, PhD, RN†
Sharon VanRiper, MS, RN‡
Sachin Kheterpal, MD*
Richard Burney, MD§

Surgical site infections are a frequent cause of morbidity and mortality and add significantly to the cost of care. One component of the national Surgical Infection Prevention (SIP) program is to ensure timely administration of prophylactic antibiotics, a key factor to reduce postoperative infection. Our anesthesia department decided to assume the responsibility for timing and administration of antibiotic prophylaxis and we initiated a multtiered approach to remind the anesthesiologist to administer the prophylactic antibiotics. We used our anesthesia clinical information system to implement practice guidelines for timely antibiotic administration and to generate reports from the database to provide specific feedback to individual care providers with the goal of ensuring that patients receive antibiotic prophylaxis within 1 h of incision. Before the initiation of this project, 69% of eligible patients received antibiotics within 60 min of the incision. After the program began, there was a steady increase in compliance to 92% 1 yr later. Provider-specific feedback increases compliance with practice guidelines related to timely administration of prophylactic antibiotics. Anesthesia information systems hold promise for implementing and monitoring new practice guidelines and the anesthesiologist may play a key role in influencing surgical outcomes by ensuring appropriate therapy that may not be directly related to anesthesia care.

(Anesth Analg 2006;103:908–12)
Beta Blockade
### Perioperative Beta Blocker Administration

<table>
<thead>
<tr>
<th>Beta Blocker Contraindications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
</tr>
<tr>
<td>Bradycardia</td>
</tr>
<tr>
<td>Bronchospasm</td>
</tr>
<tr>
<td>Mobitz II or complete AV block</td>
</tr>
<tr>
<td>History of adverse reaction to be</td>
</tr>
<tr>
<td>Decompensated CHF</td>
</tr>
<tr>
<td>Active major hemorrhage</td>
</tr>
</tbody>
</table>

### Beta Blocker Action(s)

- Perioperative beta blocker not indicated [less than 3 risk factors]
- Patient received PO beta blocker
- Perioperative beta blockers admin
- Perioperative beta blockers cont

### Other

- Beta Blocker Contraindications
  - Hypotension
  - Bradycardia
  - Bronchospasm
  - Mobitz II or complete AV block
  - History of adverse reaction to be
  - Decompensated CHF
  - Active major hemorrhage

- Beta Blocker Indications
  - On beta-blockers as per protocol

### Item Selected

- Beta Blocker Action(s), Perioperative ...
- N/A
Administrative Use of AIMS

Providing Value to the Hospital
Hospital Quality Reports

- Returns to OR
  - Second operation within same hospitalization
- Anastomotic leak
- Surgical operation log
- PACU statistics and pain at discharge
- 48 hour post-anesthesia mortality
- Postop complications (standard CMS list)
- CLABS prevention program compliance
- Central line education report
- OR utilization reports
Table 4. Missing Data Report Elements

1. Service date  
2. Internal case ID  
3. Case number  
4. Medical record number  
5. Patient name  
6. Patient date of birth  
7. Attending anesthesiologist 1  
8. Attending anesthesiologist 1 e-signature  
9. Attestation comments  
10. Attending anesthesiologist 2  
11. Relief date/time 1  
12. Attending anesthesiologist 2 e-signature  
13. Attending anesthesiologist 3  
14. Attending anesthesiologist 3 e-signature  
15. Relief date/time 2  
16. CRNA 1 e-signature  
17. CRNA 2 e-signature  
18. ASA classification  
19. Performed procedure  
20. Primary anesthetic technique  
21. Preoperative diagnosis  
22. Postoperative diagnosis  
23. Surgeon  
24. Anesthesia start time  
25. Anesthesia end time
## Daily Clinical Productivity

<table>
<thead>
<tr>
<th>Case Number</th>
<th>Start Time</th>
<th>End Time</th>
<th>Points</th>
<th>Concurrency Adjustment</th>
<th>PostOp Note</th>
<th>Call Related</th>
<th>Complete ness</th>
<th>Final Points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Cardiac 1 N/A</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>9:28</td>
<td>10:34</td>
<td>195</td>
<td>0.97</td>
<td>1</td>
<td>N/A</td>
<td>1</td>
<td>190</td>
</tr>
<tr>
<td>2</td>
<td>20:00</td>
<td>23:24</td>
<td>310</td>
<td>N/A after 1800</td>
<td>1</td>
<td>N/A</td>
<td>1</td>
<td>310</td>
</tr>
<tr>
<td>3</td>
<td>9:00</td>
<td>10:43</td>
<td>255</td>
<td>0.97</td>
<td>1</td>
<td>N/A</td>
<td>1</td>
<td>248</td>
</tr>
<tr>
<td>4</td>
<td>17:45</td>
<td>18:00</td>
<td>27</td>
<td>0.97</td>
<td>1</td>
<td>N/A</td>
<td>1</td>
<td>27</td>
</tr>
<tr>
<td>4</td>
<td>18:00</td>
<td>21:28</td>
<td>378</td>
<td>N/A after 1800</td>
<td>1</td>
<td>N/A</td>
<td>1</td>
<td>378</td>
</tr>
<tr>
<td>5</td>
<td>11:10</td>
<td>15:25</td>
<td>420</td>
<td>0.97</td>
<td>1</td>
<td>N/A</td>
<td>1</td>
<td>409</td>
</tr>
<tr>
<td>6</td>
<td>15:50</td>
<td>18:00</td>
<td>206</td>
<td>0.97</td>
<td>0.9</td>
<td>N/A</td>
<td>1</td>
<td>181</td>
</tr>
<tr>
<td>6</td>
<td>18:00</td>
<td>20:15</td>
<td>214</td>
<td>N/A after 1800</td>
<td>0.9</td>
<td>N/A</td>
<td>1</td>
<td>193</td>
</tr>
</tbody>
</table>

**Total**: 2836
2013 Points Budget: 27.8m points

- Clinical Anesth.*: 62%
- Leadership: 8%
- Academic: 10%
- CSICU: 5%
- Pain Management: 7%
- Outlying Hosp Leadership: 3%
- Professionalism: 5%

74% of these are productive points
## Comparison of the Pre- and Post-Implementation Periods

<table>
<thead>
<tr>
<th></th>
<th>Pre-Implementation</th>
<th>Post-Implementation</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Monthly ASA Units</td>
<td>43,563</td>
<td>49,594</td>
<td>.0001</td>
</tr>
<tr>
<td>Average Monthly ASA Units per OR FTE</td>
<td>601</td>
<td>790</td>
<td>&lt;.0001</td>
</tr>
<tr>
<td>Average Monthly ASA Units per Location</td>
<td>1268</td>
<td>1147</td>
<td>.046</td>
</tr>
</tbody>
</table>
Mean Faculty Salary Ratios by Rank Grouping c/w 2001

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Instructors and Assistant Professors*</td>
<td>1.12</td>
<td>1.57</td>
</tr>
<tr>
<td>Associate and Full Professors</td>
<td>1.01</td>
<td>1.35</td>
</tr>
</tbody>
</table>

*Higher mean salary increase for Instructors/Assistant Professors compared with Associate and Full Professors across periods (p<0.001)

&Higher mean salary increase for post-implementation period compared with pre-implementation across rank groupings (p<.0001).

Administrative

- ACGME report automatic generation
- EPIC interface
- Tracking system
  - OR Control Desk, Family Waiting Room, Assessment Area, PACU’s, Bed assignment unit, Cardiac White Board, Event Notification
- Scheduling system
  - Daily assignments
  - Night and weekend calls
  - Time off
  - Web displays and reports
- Personnel system
Research
BP Excursions and Mortality

Anesth Analg 2011;113:19–30
Unpublished Data
I used to think correlation implied causation.

Then I took a statistics class. Now I don't.

Sounds like the class helped.

Well, maybe.
Hemodynamics, Anesthetic Depth and Mortality

- Association does not prove causation
- Why should a brief period of hypotension or deep anesthesia be associated with hospital mortality?
  - Acute organ injury?
  - Anesthetic “stress test” is a marker for patients with more severe underlying illness?
    - Cancer patients (debilitated) have exaggerated responses to “standard” anesthetic doses
Clinician/DSS Feedback Loop

- AIMS
  - Near Realtime OR Datastore
  - q 30 second updates; 1-2 min latency
- Anesthesia Machine & Monitors
  - q 15 second sampling
- Patient
- Decision Support System
- Clinician
  - Notifies Clinician
  - Clinician Acknowledges
Prevention of Intraoperative Awareness with Explicit Recall in an Unselected Surgical Population

A Randomized Comparative Effectiveness Trial

George A. Mashour, M.D., Ph.D.,* Amy Shanks, M.S.,†
Kevin K. Tremper, Ph.D., M.D.,‡ Sachin Kheterpal, M.D., M.B.A.,§
Christopher R. Turner, M.D., Ph.D., M.B.A.,|| Satya Krishna Ramachandran, M.D., F.R.C.A.,§
Paul Picton, M.D., F.R.C.A.,§ Christa Schueller, B.S.,# Michelle Morris, M.S.,**
John C. Vandervest, B.S.,†† Nan Lin, Ph.D.,††† Michael S. Avidan, M.B., B.Ch.§§
Prevention of Intraoperative Awareness with Explicit Recall in an Unselected Surgical Population

A Randomized Comparative Effectiveness Trial

George A. Mashour, M.D., Ph.D.,* Amy Shanks, M.S.,†
Kevin K. Tremper, Ph.D., M.D.,‡ Sachin Kheterpal, M.D., M.B.A.,§
Christopher R. Turner, M.D., Ph.D., M.B.A.,|| Satya Krishna Ramachandran, M.D., F.R.C.A.,§
Paul Picton, M.D., F.R.C.A.,§ Christa Schueller, B.S.,# Michelle Morris, M.S.,**
John C. Vanderveest, B.S.;†† Nan Lin, Ph.D.;‡‡ Michael S. Avidan, M.B., B.Ch. §§

Anesthesiology 2012; 117:717–25
Surgeon Efficiency
354,507 Total Cases

223,950 Cases with 1 CPT Code

130,557 Cases with >1 CPT Code

584 Surgeons

1,326 CPT Codes

5,443 Surgeon CPT Combinations
Association Between Average Z-score and CPT Specific Z-Score

Z-Score for the CPT code
Summary and Discussion

- Report generation needs: OR operations, quality, PQRS, custom reports
- Managing people with data
  - Linking quality with compensation
- Managing all of the missions of the Department