Myths in Economics of Anesthesia
Confirmed, Plausible, or Busted?

- Focusing on turnover time will improve OR throughput.
- Because anesthesia revenue includes time, anesthesia providers prefer longer surgeries.
- Going from physician-only staffing to medical direction staffing will reduce staffing costs.
- Using “per provider” (aka FTE) measurements allow for accurate benchmarking of productivity.

Focusing on turnover time will improve OR throughput.

- OR throughput \(\rightarrow\) end measure is doing more cases.
- Most commonly: If turnover time was only shorter …

“If turnover time was just shorter, we would be able to do more cases.”

- A dead horse – stop beating it
- The Reality: Turnover time is non-billable time – no revenue for anesthesiologist
- Incentive exists to work faster – go home earlier & with same revenue

Do One More Case

- Simply reducing turnover time will not result in one more case being done.
- Example:
  - Average turnover is 38 minutes
  - Average h/case is 2.1 hrs
  - Therefore perform 3 cases/OR = 2 turnovers
  - Reduce turnover by 20% = 8 minutes
  - Per day Per OR = 16 minutes
- For short cases (e.g., BMT), turnover time already short (e.g., 10 min)
Focus on Delays rather than Turnover!

- Instead of focusing on reducing turnover, focus on delays
- Delays = any turnover greater than maximum acceptable for an OR
  - Example 40 minutes is maximum
- Focus on Delays
  - Any turnover >40 minutes, don’t spend time on
  - If delay occurs (turnover of 75 minutes), focus on why and reduce to 40 minutes
- Results in 35 minutes saved in the one OR for that day
  - Compare with the 16 minutes by reducing turnover by 20%

Improving OR Throughput

Traditional Approach

- “Work more efficiently with the people you already have”
- Interdisciplinary work flow assessment and redesign
  - Involve all services – nursing, surgical, and anesthesia. Includes physicians
  - Look at workflow, delays, and system issues
  - Agree on times and publish different times
- Example...

Anesthesia Resident’s Life

- By involving equipment technician and Pharmacy, reduced the workflow of the anesthesia resident
- Did this for all job descriptions

So why is not sustainable?

- Another example: Turnover time and OR throughput initiative
  - Publish turnover times
  - New rule “Anyone can bring patient back once room is mopped”
  - Worked great for 3 months …
  - Educated once, saw success and stopped focusing
  - Other reasons it, approaches may not be sustainable:
    - Focused on the wrong process, e.g., first-case starts
    - Did not involve all parties
    - Did not have buy-in from all
- Alternative approach…

Move from Series to Parallel Processes

Anesthesiology August 2005 Issue

Deliberate Perioperative Systems Design Improves Operating Room Throughput

Marisa D. Sendakova, M.D., Ph.D.; Delaney DeLox, M.S.; Alex Szyszko, M.S.; Michael J. Goldwater, M.D. C.M., S.R.I., S.; Julian M. Goldwater, M.D., Ph.D., F.A.C.S.; David R. Raftery, M.D.

Overlapping Induction of Anesthesia

An Analysis of Benefits and Costs

Robert Harris, M.D.; Glenn Buchwald, M.D.; Peter R. Turner, M.D.; Bertil Boles, M.D.; Andreas Schlepper, M.D.; Emmanuel Tomassetti, M.D.; and Anna Zizzi, M.D.

Use of Anesthesia Induction Rooms Can Increase the Number of Urgent Orthopedic Cases Completed within 7 Hours

Philo P. T. Tepley, M.D.; Stelios A. Manoleas, M.D.; Ph.D.; Manoleas L. Tepley, M.D.; Ph.D.; Ph.D. P. P. Tepley; A. Agost, M.D.; Ph.D.; B. K. Tepley, M.D.; Ph.D.

Series to Parallel Process

Not a reduction in actual time, but movement of time to be done simultaneously by more people.

Anesthesiology 1998; 86:896

Archives of Surgery 2006; 141:55
Series to Parallel Process

- Not new. Done in past when surgeon had two rooms! (even two patients in same room!)
  - Worked well for surgeon who was fast and doing short cases.
  - Logical if non-surgical time = surgical time (or significant fraction)
  - That is if emergence + cleanup + induction is close to surgical time
- Used regularly when institution has “preoperative block room” \(\rightarrow\) induction rooms for regional anesthesia cases.

Increase Staffing

- Economic sense? Yes, if …
  - Revenue increase more than staffing costs
    - Dependent on payer mix (revenue) and the staffing costs of the market
    - Both anesthesia and nursing market
  - Can actually result in reduction of staffing costs even if more staff needed
    - Reduction of overutilized time (overtime) and evening staffing (shift differential)
- Who should use it?

Parallel Process: Should you use?

- May make sense in selective cases
- Short cases:
  - Worked well for short cases
  - Similar to historical use
- Regional anesthesia
  - 15 min patient out of room time
  - Required
    - More personnel
    - Facility (especially for setup of back table)
    - Patient Selection

Putting “it” in practice

- From Mayo Clinic
- Multidisciplinary group
  - Traditional method
  - But used new methodology and advantage of integrated system to meet challenges
- Key findings and interventions:

Key Findings and Interventions

1. Unplanned surgical volume variation
   - Better scheduling (standardized posting), better prediction, better communication
2. Streamline preoperative process
   - Both preoperative evaluation and on day of surgery.
3. Reducing non-operative time
   - Parallel processing including procedure and induction rooms
4. Reducing redundant information collection
   - Truly integrated their multiple information systems and applications
5. Employee engagement
   - Communication, end-user focused, multi-disciplinary involvement

Table 1: J Am Coll Surg 2011;213:86
Mythbuster: Focusing on turnover time will improve OR throughput.

- Busted if focusing on “turnover time” alone
- Plausible if focused on processes that occur during turnover.
- Confirmed if focus is on process of total perioperative period
- Hence, Plausible.

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  **Plausible**
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“Yes, we bill and get paid for time.”

- Yes, we do bill for time
  - \( t_{ASA} \) billed = base units + time units
  - \( t_{ASA} = \) total ASA units
- No, this is not an incentive to work slow
- Incentive to work faster → do more cases and hence more base units
- Taxi Drivers ...

Surgical Duration and Anesthesia Billing

\[
\text{tASA} = \frac{\text{Total ASA Units}}{\text{Hour of Care}} = \frac{\text{Total Base + Total Time Units}}{\text{Total Time Units} \div 4}
\]

- If two groups work 8 billed hours, then for both groups:
  \[
  \text{tASA} = \frac{\text{Total Base} + 32 \text{ units}}{8 \text{ hrs}}
  \]
- Only difference is Total Base Units billed
- What determines Total Base Units billed → number of cases done in 8 hrs and base/case

\[1 \text{ Anesth Analg 2001;93:1537}
2 \text{ Anesthesiology 2002;97:608}\]
Mythbuster: Because anesthesia revenue includes time, anesthesia providers prefer longer surgeries.

- You can bill more if you do more cases in the same amount of time.\(^1,2\)
  - i.e., if you are going to be there for 10 hours, you bill more if you do more cases.
  - Incentive to "work faster"
  - Anesthesia billing and surgical duration \(\to\) tASA/hr
- Myth: Busted!

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Going from physician-only staffing to medical direction staffing will reduce staffing costs.

- How to evaluate?
- What kind of cost analysis?
  - Cost Minimization
  - Cost Benefit/ Cost Effective
- You do it every day!

Cost Minimization vs. Cost Benefit

- First always do Cost Minimization analysis. It may turn out that the process with "better benefits" may cost the least. If not then…
  - Cost Benefit: End-points not the same
  - In this issue, Cost Benefit analysis would include
    - Physician vs. Advance Nurse
    - Perioperative care vs. OR care
    - ASA physical status 3 or higher patients
    - Outcomes data
    - Unfortunately, not enough time in this presentation
  - Cost Minimization: First step

What Car Do You Drive? Why?

<table>
<thead>
<tr>
<th>Car</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chevrolet Aveo</td>
<td>$11,245</td>
</tr>
<tr>
<td>Lincoln Navigator</td>
<td>$56,540</td>
</tr>
</tbody>
</table>

Cost Minimization VS. Cost Benefit

- Same endpoint
- Minimize costs
- Easy to understand and perform
- Problem: Downstream effect
- PERSPECTIVE IMPORTANT

Cost Minimization

- Different endpoint
- Results must be valued
- Difficult to understand
- Problem: How to value results
- PERSPECTIVE IMPORTANT

Staffing Costs = Compensation

- Yearly median compensation\(^1\)
  - Anesthesiologists
    - Private Practice\(^1\) $412,000
    - Academic (all ranks)\(^2\) $300,000
  - CRNA\(^1\)
    - All practices $186,000
- But NOT THE SAME HOURS WORKED
- Need to calculate hourly costs

\(^{1}\) 2011 MGMA Cost Survey of Anesthesia Practices
\(^{2}\) 2011 SAAA Compensation Survey
Calculate Hourly Salary

- Assume 2 weeks holiday, 4 weeks vacation, 2 weeks meeting = 52 weeks – 8 weeks = 44 weeks/yr
- Average yearly salary for 55 hours a week
- 15 hours “afterhours” at “time and half”
- For hourly wage: yearly salary divided by 40 hours + 1.5*15 hours ≈ 62.5 “regular” hours
- "44 weeks = 2750 regular hours per year"

**Physician**
- Average yearly salary for 40 hours a week
- All regular hours

**CRNA**
- Average yearly salary for 40 regular hours
- "44 weeks = 1760 regular hours per year"

Yrly Comp  | Hrly Cost
--- | ---
MD $412,000 | $150
CRNA $186,000 | $106

Note: Median Instructor and Asst Professor compensation is $293,000 (= $106/hr)
If an academic department needs to cover an additional site, it costs less to cover as MD only.

Use Hourly Costs and Apply to Staffing Model Examples:
From MD only to Medical Direction
- Many cost issues: Moving to medical direction model means less physicians to take call
  - Either increase physician compensation to reflect more call or pay CRNA to work during the "after hours"
  - Less physician available to provide perioperative medicine, including hospital committee, preoperative consults, postoperative pain, critical care (if provided)
- Examples discussed for illustration ONLY
  - Only looked at covering anesthetizing sites
  - Normalize costs to physician-only practice
  - No mixed model: some physician-only sites and some medical direction: BUT may be least costly

Examples
Example 1: No salary adjustment for hours worked. Private Practice
MD $411K, CRNA $186K

Example 2: Salary adjusted to reflect working 55 hrs (after hours, weekends). Private Practice
MD $411K, CRNA $296 (40 hrs + 15 hrs at 1.5x)

Example 3: ASC (40 hrs/wk for all). MD salary reduced by 15%. Private Practice
MD $350K, CRNA $186K

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Two Surveys for Benchmarking Anesthesiology Clinical Productivity
- **Academic Groups: SAAC Survey**
  Anesth Analg 96: 802-812; 2003
  Abouleish AE, Prough DS, Barkier SJ, Whitten CW, Uchida T, Apfelbaum JL. Organizational Factors Affect Comparisons of Clinical Productivity of Academic Anesthesiology Departments.
  • A1031 2014 Abstract ASA Annual Meeting
  2013 Median Values by Facility Type and Size
- **Private-practice Groups: MGMA Survey**
  2011 MGMA Cost Survey of Anesthesia Practices
  • 2013 Survey released, but limited participation
  Focused on group level

Using “per provider” (aka FTE) measurements allow for accurate benchmarking of productivity.
- “Using benchmarks (cases per FTE), you don’t work that hard.”
- Consultant uses “outside” benchmarks to determine staffing needs or the actual amount of work being done.
- The Hospital Administrator’s or Dean’s Logic
For Anesthesiology Groups

Staffing Needs and Workload

- For the next day, what determines how many anesthesiologists you need?¹
  - Number of clinical sites
  - Concurrency Ratio
  - 2nd Shift – Hours of operations
  - Call and PostCall

- What is not relevant?
  - Number of cases in each room
  - Amount of charges
  - Productivity measurements

1 ASA Newsletter August 2001
2 ASA Newsletter January 2013

Fallacy of the “Field of Dreams” Business Plan

- If you will build, they WON'T come!
- Groups to have to cover more anesthetizing locations – within existing facilities and new facilities
- But there has not been an equivalent increase in cases or workload
- Results in 10-20% decrease in productivity

Supporting Evidence
- Original article: 2004 and 2006 data
- Now, compare 2004 with 2010, still consistent
- Cost Survey of Anesthesia Practices, MGMA

Median, All Groups

<table>
<thead>
<tr>
<th>Year</th>
<th># of Groups</th>
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<tbody>
<tr>
<td>2004 (n=79)</td>
<td>1,653</td>
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<tr>
<td>2006 (n=86)</td>
<td>1,647</td>
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<tr>
<td>2008 (n=93)</td>
<td>9,323</td>
</tr>
<tr>
<td>2010 (n=91)</td>
<td>9,323</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th># of Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004 (n=58)</td>
<td>8,839</td>
</tr>
<tr>
<td>2006 (n=51)</td>
<td>8,959</td>
</tr>
<tr>
<td>2008 (n=65)</td>
<td>9,157</td>
</tr>
<tr>
<td>2010 (n=52)</td>
<td>9,157</td>
</tr>
</tbody>
</table>

“Per FTE” vs. “Per OR”

<table>
<thead>
<tr>
<th>Measure</th>
<th>Physician Only</th>
<th>&gt;1 CRNA/MD</th>
<th>FTE ≠ OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases</td>
<td>907</td>
<td>1,653</td>
<td></td>
</tr>
<tr>
<td>Per OR</td>
<td>933</td>
<td>915</td>
<td></td>
</tr>
<tr>
<td>IASA</td>
<td>Per FTE 8,769</td>
<td>16,647</td>
<td>IASA = total ASA units</td>
</tr>
<tr>
<td></td>
<td>Per OR 9,157</td>
<td>9,323</td>
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</tr>
<tr>
<td>Hours per Day</td>
<td>4.7</td>
<td>8.8</td>
<td>*billed time only</td>
</tr>
<tr>
<td></td>
<td>5.1</td>
<td>5.1</td>
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