

PRACTICE MANAGEMENT™ 2017

JANUARY 27-29 | GAYLORD TEXAN RESORT | GRAPEVINE, TX

2017 Practice Management Abstracts

First Place FAER Abstract Award Winner

Presentation Number: PM04

Topic 1:

1.1 Quality Improvement

Publishing Title:

Improving Pain Management by focusing on Causes of PACU Discharge Delays and Preoperative Medications

Author Block:

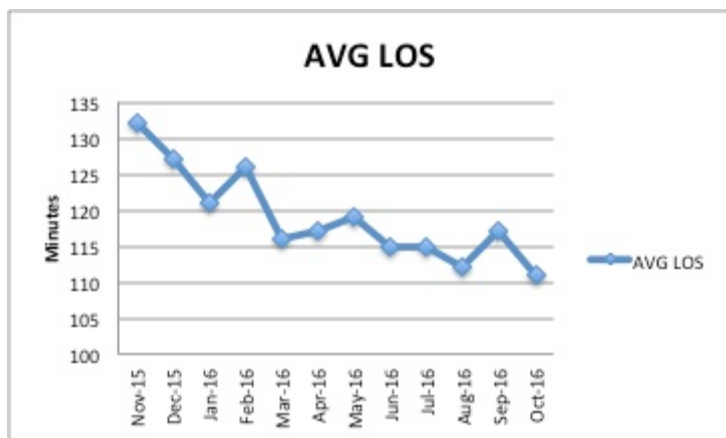
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Abstract Body:

BACKGROUND: Beth Israel Deaconess-Needham (BIDN) is a small 58 bed community hospital that recently underwent expansion from 4 ORs to 6 ORs. Surgical volume increased 15% in the last year and the increased volume put a strain on the system, including the PACU, which at times struggled to keep up with the volume. With the goal of decreasing PACU Length of Stay (LOS), a multidisciplinary QA project was implemented. **METHODS:** The project consisted of revamping the Anesthesia Quality Improvement (AQI) forms in the PACU from forms with little detail, to forms which required documentation of the time in and out of PACU and a reason for any patient staying in the PACU >60 minutes for MAC and >90 minutes for GA. Charts with delays were reviewed collaboratively by a PACU RN along with the Chief of Anesthesia for appropriateness of premedication and intraoperative medication. Data were summarized and trends with suggestions were relayed to anesthesia staff regularly. Data regarding PACU LOS and trends in pain and PONV in the PACU were also relayed monthly to the PACU staff. **RESULTS:** The overall PACU LOS decreased from 132 minutes to 111 minutes, a 16% decrease over the year. At the start of the project, 27% of outpatients had extended PACU stays because of pain management. A year later, the rates of outpatients delayed because of pain had decreased to 12% - a 55% decrease in percent of patients experiencing extended stays because of pain control. **DISCUSSION:** The initial goal of implementing the new AQI sheet was to gather more detailed data in order to focus efforts on decreasing PACU LOS. It is hard to identify which part of the intervention resulted in the improvements seen, but the continued focus on this metric likely facilitated improved results. The regular collection of data and sharing of trends facilitated targeted practice improvements (such as more aggressive premedication for PONV for specific surgeries or providing chairs rather than stretchers for certain procedures) that would expedite discharge from PACU. As a side benefit, this project developed the skills of the anesthesiologists into specialists in ambulatory anesthesia, who were then able to provide patients with an improved surgical experience with better pain management and shortened PACU stays. Individual chart reviews provided an educational opportunity for PACU nurses to learn about anesthesia and medications, self-reflect on their practice and learn about improved practice patterns, while collaborating to decrease PACU LOS.



Second Place FAER Abstract Award Winner

Presentation Number: PM05

Topic 1:

1.4 Research in Perioperative Management

Publishing Title:

Benchmarking Clinical Productivity for Non-Operating Room Anesthesia Cases

Author Block:

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Abstract Body:

Introduction: There has been little in the validation of operating room management metrics to non-operating room anesthesia (NORA) cases lists. This lack of knowledge is in stark contrast to the well-developed management frameworks for the management of the operating room. Superimposed upon these differences between NORA and OR cases is an underlying assumption that clinical productivity (and the opportunity costs) is similar for both environments. In this study, we stratified the billing data for various NORA sites across our institution and characterized the variability based upon geographical location and proximity.

Methods: We extracted the monthly billing data (PARmanage, Newton, MA) for NORA case types at our institution from January to December 2015. We excluded cases performed on the weekends and holidays and all ECT and obstetric cases were extracted. Three productivity measures were then calculated for each service using Microsoft Excel (Redmond, WA): billed hours/site/year, total American Society of Anesthesiology units (tASA)/site/year, dollars/site/year.^{1,2} ASA time units were multiplied by four to calculated billed hours.

Further, given the variability in block allocations for NORA services, we developed a different methodology to determine the number of NORA sites per day. Our department staffs 3 distinct NORA sites each day. Over a 4-week period, each NORA site has a capacity for 60 sites or block allocations. Using the NORA block schedule, we calculated an annualized number of sites for each service line by multiplying the number of block allocations over a 4-week period by 13. For example, we allocated 6 sites across the 60 block allocations available for interventional radiology (IR). For the purposes of the study,

IR had 1.3 sites/year ($6/60 \times 13 = 1.3$).

Results: A summary of the results can be found in Table 1.

Conclusions: In this study, we demonstrate that there are financial differences across different NORA locations. Anesthesiologists and anesthesia practice managers have long used productivity measures to benchmark anesthesiologists' performance.^{1,2} However, NORA case lists utilize different resources, contexts, and health care personnel. For some NORA services (e.g. electrophysiology), the cases lists resemble traditional operating lists. By contrast, most NORA services are poorly utilized and historical utilization is haphazard. Acute observers should recognize that our calculations may underestimate productivity measures because we annualized (and overestimated) the number of block of allocations. As NORA case volume continues to expand, anesthesiologists and practice managers should be aware of the financial and tactical implications of various NORA services.

REFERENCES

1. Abouleish AE, Prough DS, Zornow MH, Lockhart A, Abate JJ, Hughes J. Designing meaningful industry metrics for clinical productivity for anesthesiology departments. *Anesth Analg* 2001; 93(2): 309-12.
2. Abouleish AR, Zornow MH, Levy RS, Abate J, Prough DS. Measurement of individual clinical productivity in an academic anesthesiology department. *Anesthesiology* 2000; 93: 1509-16.

Third Place FAER Abstract Award Winner

Presentation Number: PM06

Topic 1:

1.4 Research in Perioperative Management

Publishing Title:

Creating a System-wide Operating Room Running Cap in a Large Multi-Hospital System

Author Block:

D. F. Nelson¹, R. Boretzky², T. D. Emerick¹, A. Giedraitis¹, M. E. Hudson¹;

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Abstract Body:

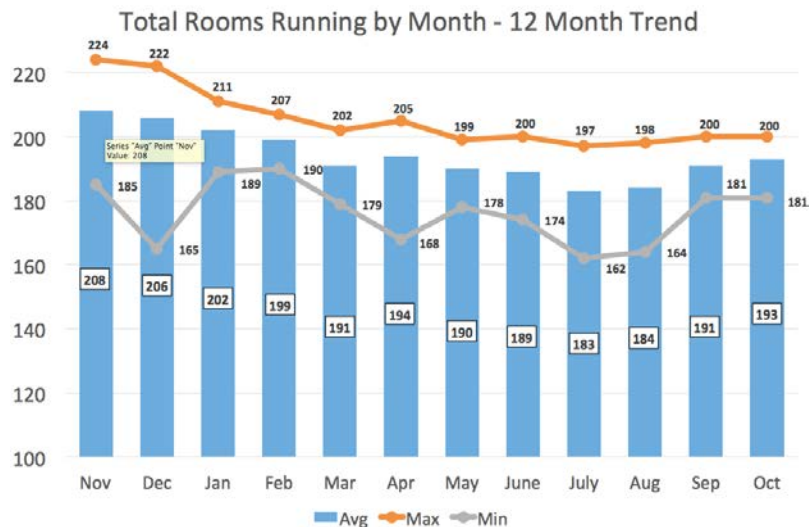
Introduction: Current economic conditions in health care increasingly demand cost-reductive strategies requiring improved operating room (OR) management. Anesthesiology Departments are ideally positioned to participate in these efforts because of their intimate familiarity with OR operations and because of the desirability of gain sharing with hospital leadership. The University of Pittsburgh Medical Center (UPMC) Dept. of Anesthesiology provides anesthesia services for the system's 14 core hospitals and can shift anesthesia providers between hospitals depending on need. Historically, the daily number of providers varied dramatically, both between hospitals and on different days of the week at the same hospital. In an effort to address this variability, UPMC sought to emphasize *system-wide* OR efficiency by tracking overall OR utilization and instituting a "sites-running" cap that would represent the maximum number of anesthetizing locations allowed across the system for a given day. This "cap" attempts to minimize the day-to-day variability in the total number of anesthesia providers.

Methods: For September—December 2015, daily anesthesia sites running data was collected for each of 14 core facilities in Allegheny County in the UPMC system. Using site-specific operating-room utilization as a benchmark for efficiency, individual hospital performance was calculated for each day using surgical minutes (wheels-in to wheels-out) divided by total available surgical minutes (number of rooms staffed to run at given site multiplied by 8 hours per room). Then, using "system-wide rules" already established for block management, optimum target caps for number of rooms running were created for each site based on historical data showing a number in which OR utilization was maximized. These individual site caps

were then used to create a system-wide cap of 200 operating rooms in May 2016.

Results: In the six months prior to the implementation of a system-wide cap, average daily OR's running ranged from 165—224, with a monthly average mean of 203 and average standard deviation of 9. (see Table 1). Average system-wide utilization during this time was 62%. After establishment of the cap, daily running OR's decreased to an average of 191 (max 207, min 162, standard dev. 7). This is accompanied by an average system-wide utilization of 63%. The decrease in average daily anesthesiology sites running from 203 prior to the cap to 191 after the cap represents yearly cost savings of approximately \$14.4 million (12 operating room reduction multiplied by avg. operating cost of \$1.2 million per room)

Discussion: In today's healthcare landscape there are many incentives to develop novel cost-reducing measures, as well as to optimize resource management. Nowhere in healthcare is this more relevant than in the operating room. While generally considered the highest revenue area of a health system, *inefficiently* used ORs can be a tremendous cost. In a large health system, capitalizing on data availability and resource sharing to develop and implement system wide "best-practices" is vital to financial success. By developing system-wide management goals based simply on utilization data, millions of dollars can be saved over the course of the year, all while preserving revenue and safety standards. It is evident that management strategies such as these are of critical importance not just for individual health systems but also for the field of anesthesiology as we strive to demonstrate value.



Presentation Number: PM01

Topic 1:

1.4 Research in Perioperative Management

Publishing Title:

Anesthesia Labor Costs at Different Hospitals Within a Large Multi-Hospital Health System

Author Block:

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Abstract Body:

Introduction: In the new value-based world of medicine, where bundled payments and other budget-based payment methodologies are an increasing reality, the need to develop an accurate cost profile for anesthesiology is evermore important. As a consequence, our department has adopted an accounting

standard based upon activity-based costing. In doing so, we have identified variables associated with high average costs per surgical hour, particularly paid FTE to patient OR hour ratios. Utilizing cost productivity has allowed us to adjust staffing models and operating room (OR) scheduling to maximize efficiency.

Methods: Operating room costs were calculated based upon the total paid full time equivalents (FTE) per surgical hour for physicians and CRNAs; physician costs only pertained to anesthesiologists, not surgeons. Total costs were gathered for FY15 and FY16 at thirteen hospitals within our health system. These costs were subsequently divided by the total number of surgical hours at each individual hospital to calculate surgery costs per hour; averages were also calculated to compare non-ambulatory surgery centers with ambulatory surgery centers (ASCs). Finally, to better understand the underlying drivers of these costs, we calculated trends from FY15 to FY16.

Results: For FY16, average costs per surgical hour for physicians ranged from \$132 to \$345, a range of \$213; for CRNAs, the average cost per OR hour ranged from \$138 to \$241, a range of \$103. The average cost per surgical hour for physicians and CRNAs at non-ASCs was \$181 and \$155, respectively; at ASCs, the averages were \$182 and \$171, respectively (Table 1). The paid FTE to patient surgical hours ratios ranged from 4.89 to 15.40; the average for non-ASCs was 5.76 and 10.42 for ASCs. At non-ASCs, average salary expense decreased by 11% from FY15 to FY16; at ASCs, average salary expense decreased by 6%. These decreases were tied to a 12% decrease in surgical hours at non-ASCs and an 8% decrease at ASCs.

Discussion: The adoption of an activity-based costing accounting practice has allowed us to more closely assess the individual components of total departmental expenditures. There was a significant range in costs among the thirteen hospitals analyzed, suggesting differences in the efficiency of labor resource utilization; for example, hospitals K and M had dramatic decreases in OR volume (-23% and -24%), but the salary expense differed significantly between the two (-24% for K and -18% for M). Our analysis has therefore allowed in the identification of both non-ASC and ASC sites to review for reasons underlying the wide disparities. This method is an initial step in developing a cost profile by hospital and surgical service that will be essential for participation in budget-based payment methodologies; further delineation by case type and service line may allow for better understanding of the cost drivers in anesthesia care delivery.

Hospital	FY16 Average Cost per OR Hour		FY15-FY16 Trend		Variability Paid FTE to Patient OR Hr Ratio
	Physician Salary Basis	CRNA Salary Basis	Salary Expense	OR Hours	
A	\$345	\$241	-27%	-25%	8.32
B	\$222	\$211	5%	3%	6.81
C	\$215	\$145	-7%	-5%	6.52
D	\$191	\$162	-4%	-7%	6.83
E	\$163	\$164	-10%	-13%	6.53
F	\$183	\$143	-6%	-11%	4.89
G	\$148	\$152	-7%	-9%	6.19
H	\$132	\$148	4%	2%	5.65
I	\$190	\$179	-4%	-7%	15.4
J	\$190	\$207	2%	0%	15.04
K	\$172	\$146	-24%	-23%	13.37
L	\$194	\$186	-10%	-3%	7.43
M	\$159	\$138	-18%	-24%	6.95
Non-ASC Avg.	\$181	\$155	-11%	-12%	5.76
ASC Avg.	\$182	\$171	-6%	-8%	10.42
System	\$181	\$156	-6.2%	-8.5%	6.37
Range	\$213	\$103			10.52

Presentation Number: PM02

Topic 1:

1.3 Challenging Cases and their Innovative Solutions in Practice Management

Publishing Title:

Integration of an Anesthesia Care Team and the Reflective Culture Change

Author Block:

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Abstract Body:**Introduction**

As the largest level 1 trauma center in the nation, home to numerous high acuity specialty surgical service lines, MHH - TMC operating rooms (ORs) are placed under considerable demand. A fundamental need of a growing marketplace and a need to expand perioperative services was developed for this facility in 2008. A retrospective review was conducted to determine if thoughtful work structure builds capital in a workforce and if practical tactics improve patient care delivery.

Materials and Methods

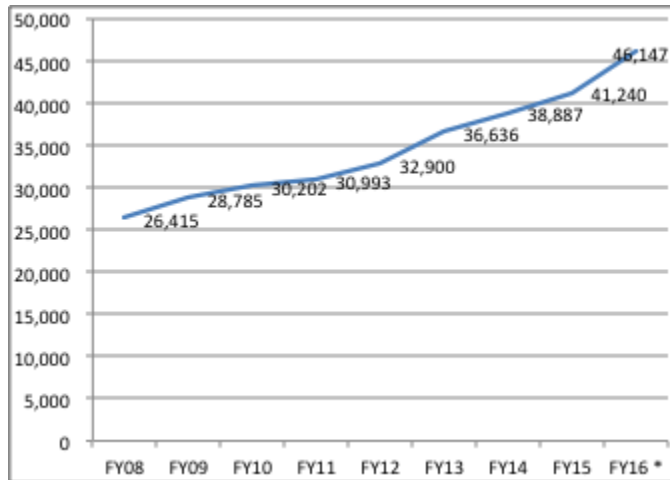
A retrospective study was performed to review the performance of several initiatives that were implemented at MHH - TMC, including the anesthesia perioperative home model of patient care, electronic OR tracking system, an anesthesia assistant (C-AA) care team model, and a POD-based system of care. The POD system ([Gen/Gyn/Uro] Transplant, Trauma, Ortho, Neuro, Plastic, [ENT/OMF/OPHTH], Pedi, Adult Cardiac) was introduced to improve efficiency, quality of patient care, and surgeon satisfaction. As the demand for service expanded, the numbers of C-AAs within the care team also expanded. Data collected included the number and types of personnel, number of cases and case cancellations, and other efficiency metrics, such as OR utilization and first case on-time starts. Specific tactics included: data sharing among the service lines and providing resources for optimization of effort. Workplace professionalism and pride was instilled in a daily task for front line personnel, and customer service was made paramount. Process and outcomes measures came from internal data sources, Vizient, and Healthstream.

Results

Baseline performance revealed many opportunities for improvement in operational excellence: first case start times, case volume, cancellations, OR utilization, and physician and employee satisfaction. Analysis also revealed a need to address workplace culture. Growth of the C-AA model went from 5 C-AAs in 2012, to 36 C-AAs in 2016. Anesthetic locations increased from 41 to 76 during 2008 to 2016. OR volume increased by 33% from 2009 to 2015, and a total volume of anesthesia cases increased by 20,000 from 2008 - 2016 (Graph 1). OR utilization increased from 67% in 2013 to 78% in 2015. First case on-time starts improved from 66% in 2009 to above 80% in 2010 and forward. Case cancellations decreased from 4% in 2009 to 1% in 2010 forward. Intentional communication over time demonstrated support between executive leadership, middle managers, and front line staff. Employee satisfaction increased composite scores for surgical care teams above target from 2009 to 2015, with composite score increasing 23% or more. Physician satisfaction increased from 20% in 2009 to 91% in 2015, with values above 95% for surgeon satisfaction with the anesthesia service. Within the busiest level 1 trauma center for FY 2016, mortality O/E ratio and case mix index data demonstrated the trauma center's exceptional outcomes in a complex patient population.

Conclusion

Strategic partnership between the hospital and physician group enabled successful change in the culture of the care team at MHH - TMC. Focus on work planning, integration, and quality improvement theory allowed for improvement in OR operational targets - quality, cost, efficiency - while improving employee satisfaction and engagement. Attention to building workplace culture enabled sustainable improvements, adding value to the hospital and hospital system. The desire for excellence and social capacity facilitates collaborative efforts and teamwork in addressing new challenges and opportunities for quality improvement.



Presentation Number: PM03

Topic 1:

1.4 Research in Perioperative Management

Publishing Title:

The Perioperative Surgical Home Reduces Length of Stay and Improves Value for Patients Undergoing Elective Cesarean Section

Author Block:

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Abstract Body:

The Perioperative Surgical Home (PSH) is a patient-centric, team-based model of care to help meet the demands of a rapidly approaching health care paradigm that will emphasize value, patient satisfaction and reduced costs. Until recently there has been little interest using the PSH for Cesarean Section, however since 2012 multiple obstetrical units in the United Kingdom introduced Enhanced Recovery Programs and demonstrated improved quality of care and significant savings with superior patient satisfaction. Our participation in the Perioperative Surgical Home Learning Collaborative and partnership with leading experts from the United Kingdom provides us with the unique opportunity to pioneer this pathway in the United States.

The first year pilot includes 100 low risk patients with the diagnosis of repeat Cesarean Section. Empowering patients to take a significant role and ownership over decisions regarding their care is essential. Our team at Saint Peter's partnered with SeamlessMD, a leading provider of a clinical intelligence platform to develop the first smartphone application to engage and empower our obstetrical patient population. Our solution has a wide range of capabilities, including a cross-platform application which accommodates patient education, reminders and the ability to perform remote monitoring. Other features are text reminders and the ability to measure performance through an analytics dashboard. Since September 2016, we have enrolled 30 patients. The average length of stay (LOS) reduced from 3.7 days to 2.7 days. We adjusted the financial model created by researchers at Johns Hopkins based on our local context and were capable of projecting the net direct variable costs and savings associated with the

adoption of our program. Based on the implementation cost of \$48,000 and daily direct variable cost savings of \$1,516 the introduction of the Perioperative Surgical Home Program will yield a 216 % ROI during the first year. The return will increase to 282% in subsequent years.

Presentation Number: PM07

Topic 1:

1.1 Quality Improvement

Publishing Title:

Enhanced Recovery Pathway for Adolescent Idiopathic Scoliosis Spine Patients

Author Block:

N. Patel¹, P. Trivedi², K. Gibbs²;

¹Pediatric Anesthesia, Texas Children's Hospital, Houston, TX, ²Texas Children's Hospital, Houston, TX.

Abstract Body:

Enhanced Recovery Pathway (ERAS) for Adolescent Idiopathic Spine Patients

Nihar Patel, MD; Premal Trivedi, MD; Karen Gibbs, MSN/MPH, RN

BACKGROUND

Adolescent Idiopathic Scoliosis (AIS) surgeries are routinely performed at Texas Children's Hospital during the summer months as most patients and families wish to avoid having the recovery course impede school attendance. Given the combination of lengthy recovery course combined with seasonal increase in summer surgical volume, a bottleneck occurs which limits the hospital's capacity to treat children with AIS. The current length of stay (LOS) of patient's undergoing surgery for AIS is 4.7 days with the largest barriers to discharge being pain control and the time necessary to transition to oral pain medications.

PROJECT AIMS

We aim to reduce average LOS by 0.5 days and optimize the post-operative patient experience by introducing an enhanced recovery pathway for patients with AIS undergoing surgical repair with posterior instrumentation and fusion

METHODS

After reviewing literature and protocols from other facilities, we held focus groups with surgeons, anesthesiologists, and nurses to identify factors negatively impacting the patients' experience and we created a fishbone diagram and key driver diagram.

PDSA Cycles:

Pain Management

PDSA Cycle 1: Standardizing medication administration

PDSA Cycle 2: Issues with adherence to gabapentin. Met with staff, added to Omnicell and compliance improved.

PDSA Cycle 3: Difficulty transitioning patients off PCA in PM, re-confirmed with RNs of who to contact, compliance improved

Nausea and Vomiting

PDSA Cycle 1: Standardizing medication administration

PDSA Cycle 2: (Planning phase) Adding additional medications to control nausea/vomiting

Bowel Function

PDSA Cycle 1: Standardizing medication administration, scheduling suppositories

PDSA Cycle 2: (Planning phase) Meet with stakeholders to determine future interventions.

Overall: Pre- and post-implementation surveys were completed to ensure that there was no sacrifice to patient satisfaction in these efforts. Distribution methods were changed from cycle 1 to cycle 2 to improve

capture rate.

RESULTS:

In review of our baseline data, we had an average LOS of 4.7 days. Following implementation of the enhanced recovery pathway on July 11, 2016, we achieved our aim in reducing LOS to 4.2 days. There were no readmissions or incidences of dehiscence.

Surveys were given to all patients and evaluated patient comfort in the three major areas (pain management, nausea/vomiting, and bowel function). According to our survey data, the patients on the enhanced recovery pathway had a statistically significant improvement in the overall survey score than compared to the pre-intervention group ($p < 0.01$).

DISCUSSION

Driving the decreased LOS were likely improvements in pain management, and relatedly, earlier ambulation. Decreases in nausea, vomiting, and constipation were not as apparent, but may have nonetheless contributed to a decreased LOS in ways that our data could not illustrate.

Given these improvements, we plan to continue this protocol in AIS patients. To ensure consistency and adherence, an order set will be developed in EPIC. Other next steps will include (i) identifying the impact of decreased LOS on throughput and revenue, (ii) developing a formal perioperative guide for patients and their families, (iii) changing metoclopramide to a scheduled agent to address nausea, (iv) continuing dialogue with nursing to improve management of nausea and constipation, and (v) evaluating the role, if any, of post-operative anemia in LOS.

Presentation Number: PM08

Topic 1:

1.3 Challenging Cases and their Innovative Solutions in Practice Management

Publishing Title:

Challenges in Managing the Patient, Expectations, and the Entire Multi-Disciplinary Team During Left Atrial Myxoma Removal in Patient With Intrathoracic Endotracheal Compression

Author Block:

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Beaumont Health, Royal Oak, MI.

Abstract Body:

Case Presentation

A 65-year-old female with a history of COPD and CHF presented with worsening of her chronic shortness of breath. During her work-up, she was found to have a 4.2 cm right-sided substernal thyroid mass with significant mass effect on her trachea. Furthermore, on the same CT scan, a left atrial mass was visualized. A transthoracic echocardiogram was conducted and confirmed that the mass (likely left atrial myxoma adherent to the intra atrial septum) measured 6.4 x 4.6 cm. The mass prolapsed into the mitral valve annulus causing severe functional stenosis. A multi-disciplinary team meeting was conducted, and the decision was made to perform a minimally invasive left atrial myxoma removal. Due to the need for heparinization for cardiopulmonary bypass and the corresponding increased risk of blood loss, it was determined that the patient would undergo a thyroid mass removal at a later date.

Discussion

Myxomas are the most common cardiac mass, 75% of which are found in the left atria. When the cardiac mass causes functional mitral stenosis, goals include maintaining high preload, sinus rhythm with low normal heart rate, and high afterload.

Individuals with intrathoracic tracheal compression experience perioperative cardiorespiratory complications 14.3%. Major concern for inability to ventilate with airway manipulation or positioning. Furthermore, due to distal tracheal compression, there exists a serious concern for an inability to pass the endotracheal tube past the obstruction.

Steps of Management

1. Preoperative room discussion with the entire multi-disciplinary team regarding the case and goals.
2. Bring the patient to the operating room. Position the patient. Ensure intravenous access. Standard ASA monitors.
3. Left radial arterial line.
4. Start remifentanyl for conscious analgesia.
5. Insertion of bladder catheter (nurse).
6. Left Femoral Cordis
7. Right fascia iliaca block
8. Prepped and surgically draped the patient (cardia P.A.s)
9. Right-sided surgical dissection to the femoral vessels (surgeon)
10. Awake fiberoptic intubation using fiberoptic scope/
11. Cardiopulmonary bypass and minimally invasive left atrial myxoma removal under general
12. Transfer to ICU intubated

Conclusion

Left atrial myxomas causing functional mitral stenosis paired with intrathoracic compression causes a unique hemodynamic and anesthetic challenge. Patient education and expectation-setting is crucial for intraoperative care in an awake patient. Furthermore, extensive planning and diligent management of the multi-disciplinary operative team is essential for protection of the patient's health.



Presentation Number: PM09

Topic 1:

1.4 Research in Perioperative Management

Publishing Title:

Prehabilitation of Colorectal Surgical Patients: Does Implementation of Prehabilitation Classes Improve Patient Empowerment and Surgical Experience?

Author Block:

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¹Beaumont, Royal Oak, MI, ²Beaumont Health, Royal Oak, MI.

Abstract Body:

Background: Currently there are no standardized means of managing expectations of patients undergoing complex surgical procedures. Efforts in the past have failed due to being overly complex and often result in patient confusion, dissatisfaction, and poor compliance. Preoperative education for patients scheduled for spinal and total joint replacement procedures has demonstrated to have a positive impact upon outcomes and patient satisfaction. We present this prospective patient reported survey to determine if implementation of a prehabilitation class will increase feelings of patient empowerment, and improve overall surgical experience for patients. **Methods:** Following local IRB approval, patients undergoing non-emergent colorectal surgery at two hospitals by surgeons participating in the Enhanced Recovery After Surgery (ERAS) protocol were asked to participate in the study. Patients who completed the class were provided a Patient Empowerment Survey matched to control patient who did not attend the class prior to their hospital discharge. **Results:** A total of 228 patients completed the patient empowerment survey. Of those surveyed 160 participated in the prehabilitation class, 68 patients did not. The results are summarized in figure 1. Our results demonstrates that individuals that attended prehabilitation education classes were more likely to report feeling adequately prepare for surgery, able to participate in their own recover, and having had their expectations met. **Conclusions:** This prospective survey method of colorectal surgical patients demonstrates that prehabilitation in-person educational classes can improve patient's satisfaction. Patients that attended prehabilitation classes reported having great feelings of preparation, involvement, understanding, and empowerment. With these results, it is reasonable to suggest that in the future expanding prehabilitation education classes to individuals undergoing other types of surgical procedures may be beneficial in improving patient satisfaction and providing added value to care.

Figure 1. Results of Patient Empowerment Survey

Question	Prehabilitation Class Participant (Mean)	Non-Prehabilitation Participant (Mean)	P-Value
1. Did you attend the "Preparing for your Colorectal Surgery Class"?	N=160	N=68	
2. I feel like I was adequately prepared for my colorectal surgery?	90.7	79.8	0.003
3. I feel like I can actively participate in my own recovery?	90.5	82.5	0.002
4. I feel like my expectations for surgery were adequately met?	89.9	81.6	0.002
5. I feel encouraged and enabled about my recovery?	95.3	81.5	0.016
6. I feel like I was physically and mentally prepared for my surgery?	89.4	80.1	<0.001
7. I feel like I was involved in the decision making about my surgical care?	89.9	81.2	0.002
8. I understood the health information provided to me about my surgery?	90.8	81.9	<0.001
9. I feel like I had the access to the information I needed about my surgery?	90.6	81.8	<0.001
10. I feel prepared to care for my own health after my surgery?	89.1	81.1	0.001

Presentation Number: PM10

Topic 1:

1.1 Quality Improvement

Publishing Title:

Starting a Comprehensive Quality Program: Pitfalls and Lessons Learned.

Author Block:

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Abstract Body:

Creating a robust and comprehensive quality program can be a daunting task for a large academic department. Designing a system that meets all your regulatory, quality improvement, and academic needs requires both vision and persistence. It's important to maintain a balance between this grand vision

and the necessary attention to details that lead to success. In 2013, we undertook a project to move our quality reporting system away from an incident based self-reporting system to a 100% capture system and inclusion in the Anesthesia Quality Institute (AQI). Our charge was to design a system that meets our needs for process improvement, quality assurance and benchmarking. After much effort, we have developed a program that meets these needs but is in a state of constant evolution. Here we present some of the discoveries and pitfalls we've made along the way.

- **Organization is key:** Operationally we needed to capture all anesthetic activity from an average 80 cases per day from 39 anesthetizing locations by over 70 anesthesia providers. Ours is a 24 hour a day trauma center with a very active Non OR Anesthesia (NORA) footprint which means quality data comes in all the time and from all over. This ultimately required mapping out every single possible anesthetic scenario and bundling them into common pathways.
- **Technology is great, however simple is sometimes better:** Our EMR is fragmented and comprised of multiple systems that often do not communicate—this makes submitting and extracting data very complicated. Moreover, some sites utilize paper records. Therefore we opted to base our system on a paper check sheet.
- **Lots of data comes quickly:** With the use of our paper collection method we quickly acquired piles of data that required sorting, analyzing and storage. After six months we were able to fill an entire file cabinet and we had to make some decisions about form retention.
- **A project of this size requires a champion:** A key driver or driver for certain areas must constantly maintain, refine and regulate the process. Without a champion, provider non-compliance quickly sets in.
- **Can't depend on one person:** The size of this project requires multiple committed individuals to keep up with the data collection, analysis, storage and submission.
- **Paper is great, but ultimately data must get it into digital format:** At first we hand logged all cases by hand but we found this to be untenable. The process evolved to only capture QI events but this unfortunately neglected relevant case data and case counts. Through a digitization vendor we were able to capture all these elements.
- **System must be compliant with HIPAA and QI protections:** With lots of potentially personally identifiable information at risk, we have had to design a secure system that works in the framework of our institution's QI department and safely transmits only non-identifiable information outside.
- **This project can reap unforeseen benefits:** We've been able to use QI data numbers to demonstrate increased volumes, analyze areas of activity and patient acuity. Moreover, with the ability to benchmark against other groups we have been able to demonstrate value in our practice.

Presentation Number: PM11

Topic 1:

1.1 Quality Improvement

Publishing Title:

Development of a Personalized Smart Schedule in an Outpatient Chronic Pain Clinic through Use of a Gantt Diagram

Author Block:

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Abstract Body:

Introduction: A Gantt diagram is a horizontal bar chart that can be used to analyze process efficiencies. This chart is commonly applied to project schedules to achieve better visibility of work flow constraints (eg. bottlenecks in processing rate or wait time). A five-day sample of patient waiting and service times in a single provider chronic pain clinic schedule was analyzed using this method with the aim of identifying

scheduling inefficiencies and reducing wait time. To the best of our knowledge, a personalized schedule based on diagnosis, mean service time, and mean wait time using a Gantt diagram has not been applied to this setting in an effort to create a more efficient schedule.

Methods: After hospital QI committee approval, data for the development of the Gantt diagrams were collected from 81 patients from five separate clinic days during March 2016 at University of Pittsburgh Medical Center Montefiore Chronic Pain Clinic. All patients were under the medical care of the same attending. Data collected included patient appointment time, patient diagnosis, new patient versus follow up visit category, arrival time, time when the provider entered the room, and the time when the provider left the room. Total service time included the total time a mid-level provider, resident, fellow, or attending physician spent with the patient as well as injection time.

Results: A Gantt diagram (Figure 1) was created using Microsoft Excel® software. A separate Gantt diagram was created using for each clinic day with the appointment time displayed on the x-axis and the de-identified patient number of the y-axis. Daily patient mean wait time and mean service time data were calculated, and mean service times were stratified by diagnosis for the 5 clinic days. Summary data is presented in Table 1. The mean wait duration for new patients was 25 ± 21.8 minutes and 22.4 ± 17.1 minutes for return patients. The mean service times for new and return patients were 25.8 ± 9.0 minutes and 20.1 ± 13.1 minutes, respectively. In this sample, mean service times were highest for chronic abdominal/pelvic pain (24.4 ± 10.5) and lowest for myalgia (8.0 ± 0).

Discussion: The Gantt diagram was used within a single UPMC pain medicine clinic to identify both scheduling inefficiencies and areas for process improvement. For example, the diagrams have identified the most common daily bottlenecks which includes overscheduling at approximately 09:30 and underbooking after 13:00. Time slots have been adjusted accordingly based on these observations. The schedule also revealed significantly different service times depending on the diagnosis; this had not previously been widely reported in the literature and would be a novel booking scheme for patients. The standard practice of booking 30 minutes for new patients and 15 minutes for follow up patients has also been shown to be different from real life practice. These smart schedules are very specific to a particular location or practice and need to be individually developed based on each clinic.

Figure 1: Gantt Diagram for Patient Wait and Service Times, UPMC pain clinics, March 2016

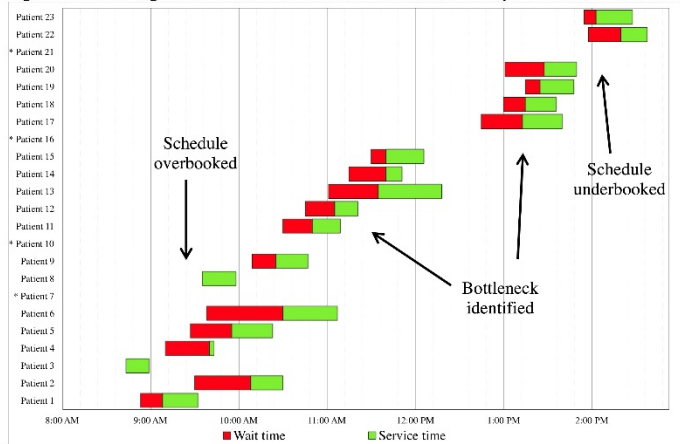


Table 1. Mean Wait and Service Time based on Pain Diagnosis*

Diagnosis	N	Wait Time †	Service Time§	Total Time
Cervical/Lumbar Radiculitis, Lumbago	27	19.8 ± 18.0	21.3 ± 16.2	41.1 ± 22.2
Facial Pain	7	26.6 ± 16.2	23.6 ± 8.1	50.1 ± 19.6
Chronic Abdominal/Pelvic Pain	30	21.9 ± 17.9	24.4 ± 10.5	46.4 ± 22.2
Other Joint Pain	6	32.8 ± 13.9	11.2 ± 8.1	44.0 ± 8.5
Myalgia	2	26.5 ± 37.5	8.0 ± 0	34.5 ± 37.5
Miscellaneous	9	24.4 ± 17.9	16.1 ± 8.9	40.4 ± 22.3
Total	81	22.8 ± 17.7	21.0 ± 12.7	43.8 ± 21.2

* Plus-minus values (minutes) are means ± SD.

† Wait time is duration of waiting period from arrival time to time in-room with provider

§ Service time is duration that provider is in-room with patient.

Presentation Number: PM12

Topic 1:

1.1 Quality Improvement

Publishing Title:

Blood Bank Access and Waste Improvement

Author Block:

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Abstract Body:

Blood Bank Access & Waste Improvement

Background: Blood product usage is a critical component of many procedures done in tertiary care centers. With the trust of these products to various hands, it is inevitable that some will be misused. In 2015, 56 blood products were mismanaged and had to be wasted for various reasons including improper storage, too long off ice, or no returned properly to the blood bank. In January 2016, a team of blood product users and handlers was convened to improve blood product availability and wastage.

Methods: With members of the team comprising physicians, managers, nurses, and perioperative staff from the Departments of Anesthesia and Perioperative Services, Obstetrics and Gynecology, Surgery, the Emergency Department, Transfusion Services, and Operating room support staff, the team met weekly over the course of four months. With meetings facilitated by a senior management engineer in the Office of Improvement and Innovation, we determined the process of use of blood products and evaluated opportunities for improvement. Blood product availability was a key goal, as was a goal of 75% reduction in blood product wastage was set.

Results: Interventions to improve usage and waste included weekly reports of blood wastage to anesthesia leadership. The blood bank began using timers to track product time out of the blood bank and ensure that blood products are properly cooled. Stickers were made and placed on coolers as prompts to ensure proper placement of products in or out of coolers. Multiple trainings were presented to anesthesia staff and trainees, operating room support staff, and the operating room community at combined safety grand rounds. Emergency department physicians implemented policies that all trauma admissions would have appropriate blood samples sent to the blood bank in preparation for urgent or emergent surgical intervention. Informational fliers on blood handling were posted in operating rooms and in anesthesia lounges to encourage and remind proper blood handling. Over 7 months since implementation of the above policies, only five units of blood product have been wasted, as opposed to the previously anticipated 56 units - a reduction of 91%.

Discussion: Interdisciplinary teamwork was critical to the process of improving blood product usage. Previously, operating room start times were delayed once weekly by 30 minutes to allow for professional development and quality improvement projects. Using this time, we met to discuss causes of wasted blood products and blood bank improvement. Improvements were attained by simple interventions including education, policy implementation, and changes in practice. To continue to facilitate improvement and continued excellence, regular reports are made of wastage to anesthesia leadership as well as at quarterly transfusion committee meetings. Continued training occurs for new anesthesia providers and operating room support staff. Financially, this project saves thousands of dollars of blood product, not even mentioning the time and gifts of the donors themselves. With this project, patient care is improved as patients have access to a greater proportion of needed blood products.

Presentation Number: PM13

Topic 1:

1.2 Leadership Development

Publishing Title:

A Potential Association Between Burnout Rates and Operating Margins for Anesthesiologists

Author Block:

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Abstract Body:

Background: Physician burnout rates have increased across most specialties in recent years and anesthesiology is without exception.^{1,2} Although this specialty has historically been sought after for a

favorable lifestyle, work-life balance, and income,³ anesthesiologists are reporting higher rates of emotional exhaustion.² In the context of changing healthcare economics, changes in burnout seen among anesthesiologists may be related to financial metrics.

Methods: In this study, we categorized each physician specialty at the University of Vermont Medical Center (UVMCC) according to operating margin ranking and corresponding burnout ranking extracted from national survey data.¹

Results: When compared to other specialties across multiple-year analyses, anesthesia most often fell into the category of high burnout/high operating margin (Figure 1).

Conclusions: In 2015, anesthesiologists rated the severity of their burnout to be higher than in previous years,² and these practitioners have reported lower rates of personal accomplishment and higher rates of emotional exhaustion.⁴ In addition, burnout among anesthesiologists has recently been attributed to an increased workload,² an overload of bureaucratic tasks,² and the leadership qualities of supervising physicians.⁵ These changes in burnout among anesthesiologists may be associated with financial metrics and reflect recent changes in health care economics. As the expanse of Medicare and Medicaid coverage continues to progress with lower rates of reimbursement,⁶ many self-insured hospitals and networks must now negotiate for competitive repayment in an inefficient market.⁷ As a result, hospital networks may now view operating margins amongst different specialties as an opportunity to shift costs.⁸ Our study demonstrates that anesthesia falls consistently among specialties with high burnout and operating margins, and necessitates further exploration of the role that financial metrics may play in burnout among anesthesiologists.

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2011.+

Presentation Number: PM14

Topic 1:

1.3 Challenging Cases and their Innovative Solutions in Practice Management

Publishing Title:

Improving Operating Room Performance with Predictive Analytics

Author Block:

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Abstract Body:

Improving Operating Room Performance with Predictive Analytics

UCHealth Metro Denver

Nathael Weitzel

Introduction:

Historically, block scheduling has posed a number of challenges for the operating room (OR) manager, including:

- Meeting surgeon needs based on preferences and case volume
- Maintaining balance
 - o Utilization
 - o Financial targets

Background:

Extracting and analyzing the appropriate data to successfully improve OR performance is time consuming and difficult. Defining clear goals and metrics has been found to enhance performance.

Primary aims: To identify an approach with clear, simplified objectives aimed to improve efficiency of processes and increase OR utilization

Method:

- Identification of key stakeholders
- Development of a multidisciplinary team
- Identification of common goals (operational, financial, and surgeon/OR staff satisfaction)
- An OR software system was implemented with unique features, including:
 - o **Actionable dashboards**
 - o **Mobile interaction capabilities**
 - o **Machine learning**

Findings:

Phase 1:

Based on a review of the literature, team feedback, institution goals aimed to reduce costs, increase efficiency, and improve quality the following features allowable with technological advances in healthcare focusing on enhancing block utilization the following important themes emerged:

- Need for increased understanding of the “why” behind OR metrics
- Need for increased ease of use for block time requests and release
- Need for an optimization of block scheduling
 - o Goal: Balance surgeon needs with financial targets

Phase 2: Mobile software was implemented providing:

- Mobile block exchange
- Software search for available blocks of OR time independently, without user
- Objective data (dashboard)
- Graphics displaying data-driven utilization patterns and forecasts

Conclusion:

The multidisciplinary team identified needs of the surgeon and the institution with the aim of mutual goal development and implementation. Interactive software was implemented and has, thus far, appeared to increase surgeon satisfaction and provides a clear process with measurable objectives meaningful to the surgeon and the institution.

Presentation Number: PM15

Topic 1:

1.1 Quality Improvement

Publishing Title:

QA/QI: Reverse ICU Handoff Tool

Author Block:

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Abstract Body:

When developing an anesthetic plan for an intensive care unit (ICU) patient scheduled for a surgical procedure, several barriers exist that limit the ability of the anesthesia provider to easily obtain information regarding the patient's clinical state. Such barriers include electronic medical records which may not be up to date with recent clinical events and the inability of the patient to provide information if they are intubated or incapacitated. Furthermore, because ICU patients requiring surgery are often unstable and require urgent or emergent procedures, the ability to obtain a thorough history is limited by time constraints. In this setting, the ICU nurse caring for the patient at bedside becomes a valuable source of information for the anesthesiologist wanting to gather information regarding such things as ventilator settings, titration of vasoactive agents, and recent clinical developments in a timely and efficient manner. Our team felt that the most effective way to transfer this information from the ICU nurse to the anesthesia provider was through a standardized handoff prior to traveling to the operating room. A need was identified to develop a standardized approach to handoff of patient information since our institution had no approach in place at the time.

With this need in mind, we aimed to develop and implement a reverse ICU handoff tool to minimize omission of pertinent data that could affect patient safety and change intra-operative anesthetic management. Development was initiated with input from several anesthesia providers in our department regarding useful information to be included on the form. A paper form was then designed to include the desired information in an organized manner with a focus on usability and interface. Following development of the form, several ICU nurses were asked to review the form to identify any barriers to implementation in the ICU such as redundancy of information, time constraints, or lack of understanding regarding the importance of the ICU to OR handoff. The form is currently in the process of being integrated into the electronic medical record pre-operative form to avoid redundancy in the information based on this feedback.

Presentation Number: PM16

Topic 1:

1.1 Quality Improvement

Publishing Title:

Outpatient Chronic Pain Clinic Scheduling Efficiency Analysis

Author Block:

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¹Department of Anesthesiology, University of Pittsburgh Medical Center, Pittsburgh, PA, ²Department of Anesthesiology, Division of Chronic Pain, University of Pittsburgh Medical Center, Pittsburgh, PA.

Abstract Body:

Introduction: A Gantt diagram is an easy to visualize bar chart often used in manufacturing or project management sectors to help analyze process efficiencies. The diagram typically is used in manufacturing process analysis to determine mean waiting time, mean processing time, and mean processing rate for a certain product in a work queue. To the best of our knowledge, this type of scheduling diagram has not been used in an outpatient clinic medical setting or a chronic pain clinic to more thoroughly understand scheduling efficiency. Queue line theory descriptive statistics can also be applied to a chronic pain clinic to analyze clinic efficiency.

Methods: After hospital QI committee approval, data for the development of the Gantt diagrams were collected from 24 patients on March 15, 2016 at University of Pittsburgh Medical Center Montefiore Chronic Pain Clinic. All patients were under the medical care of the same attending. Data collected included patient appointment time, patient diagnosis, new patient versus follow up visit, arrival time, time for provider in-room, time for provider leaving the room. Total processing (service) time was calculated as time leaving room minus time in-room. Mean waiting room wait times, mean exam room waiting times (time in exam room before provider arrived), and total exam room times (exam room waiting time plus service time) were also calculated. Provider time included the total time a mid-level provider, resident, fellow, or attending physician spent with the patient.

Results: A Gantt diagram (Figure 1) was created using Microsoft Excel® software. All patients seen on the study day in March 2016 were return patients scheduled for 15 minute appointments. Descriptive statistics included a mean processing (service) time of 22 ± 8 minutes, mean waiting time in the waiting room of 7 ± 10 minutes, mean waiting time in the exam room of 12 ± 10 minutes, and mean total waiting time of 19 ± 13 minutes. Individual service times according to patient diagnosis are provided in Figure 2. The mean time a patient spent in the exam room (exam room waiting time plus service time) was 35 ± 13 minutes, which was approximately 20 minutes greater than the typical 15-minute appointment slot. On average, patients spent 31% (S.D. $\pm 23\%$) of their total exam room time waiting for the provider.

Discussion: A Gantt diagram is a convenient way to identify bottlenecks in a schedule, such as time of day when patients wait the most and least. This information can be used to adjust appointment slots accordingly to improve schedule efficiency. Gantt diagrams can be used to make a personalized “smart” schedule for each physician based on a provider’s average service rates (provider time with patient) and waiting time rates. Schedule efficiency analysis also shows that the typical 15-minute return patient time allotment is unrealistic for specific patient diagnoses. Exam room utilization was also inefficient with approximately 31% of exam room time being used as idle time. Rooms can be utilized more efficiently by increasing provider (service time) coverage or consideration of scheduling by diagnosis instead of the designated 15-minute allotment for return patient (30-minute allotment for new patient) appointment.

Figure 2: Individual service time versus allotted 15-minute service time for return patients, March 2016

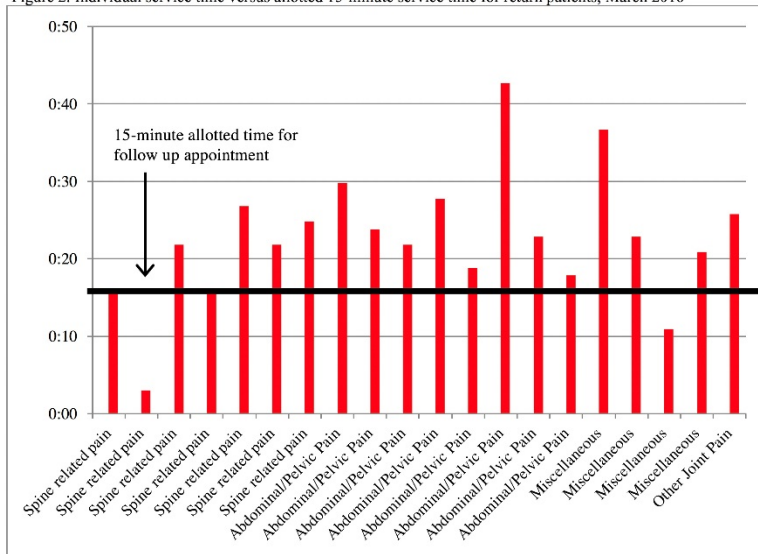
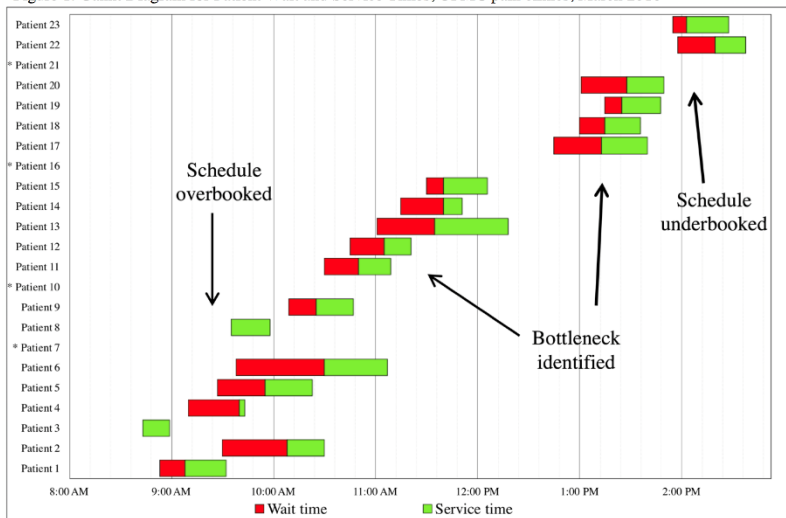


Figure 1: Gantt Diagram for Patient Wait and Service Times, UPMC pain clinics, March 2016



*Patient no-show

Presentation Number: PM17

Topic 1:

1.2 Leadership Development

Publishing Title:

A Web-Based Operating Room Curriculum for Surgical Training Programs

Author Block:

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¹Anesthesiology; Orthopaedics and Rehabilitation (by courtesy), University of Vermont College of Medicine, Burlington, VT, ²University of Vermont College of Medicine, Burlington, VT, ³Anesthesiology,

University of California San Diego, San Diego, CA, ⁴Anesthesiology, University of Vermont College of Medicine, Burlington, VT.

Abstract Body:

Introduction: For now, many surgical and orthopaedic departments may lack the expertise required to navigate the changes in health care. In 2015, Tsai et al demonstrated that a web-based educational module on operating room management was just as effective as traditional didactic lectures.¹ In 2016, we studied the implementation of the educational web module for surgical residents in orthopedics, urology, neurosurgery, general surgery, and otolaryngology. **Methods:** With permission from Institutional Review Board, we presented a formal curriculum to the Program Directors. Each resident completed a pre- and post-module test consisting of multiple-choice, open-ended, and definition questions. In the interim, they completed a one-hour web module, "OR Management Basics: Right Case, Right Time, Right Cost," a component on the continuing education section of the website for the American Society of Anesthesiologists.² We used the number of correct answers to the test questions to calculate the following statistic using SPSS (IBM, Armonk, NY) software: the pre- and post-module exam scores between each group (examined with dependent t-testing). **Results:** The mean (SD) pre-module test score for the group was 6.14 (\pm 1.07) and mean post-module test score was 9.36 (\pm 0.75) (Table 1). A comparison using a paired t-test showed a statistically significant difference between the pre-module and post-module test scores ($P = 0.001$) as seen in Table 2. **Discussion:** For the past two decades, the basic concepts of operating room management have slowly gained a foothold within the curriculum of anesthesiology training programs.³ There may be a lack of faculty expertise in perioperative management for many surgical and orthopedic departments. Despite the lack of formal training or departmental expertise, there are ways to incorporate this curriculum to meet the increasing educational content mandates for surgical training programs. Departmental chairpersons could allocate time and resources for faculty members to participate in the governance of the perioperative process at a tactical and operational level. This faculty involvement can be used as the basis for curricular development. Program directors for surgery and orthopedic residencies should consider broadening the scope of training by including educational opportunities in operating room management. We believe that this web-based component can be integrated into anesthesiology and surgical training programs. **References**

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Presentation Number: PM18

Topic 1:

1.2 Leadership Development

Publishing Title:

Opportunity Costs for Pursuing Additional Perioperative Management Training

Author Block:

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³University of California San Diego, San Diego, CA, ⁴Icahn School of Medicine at Mount Sinai, New York, NY, ⁵Brigham and Women's Hospital, Boston, MA.

Abstract Body:

Introduction: The premise of the perioperative surgical home rests on collaborative efforts of every health care member involved with patient care.^{1,2} Primarily anesthesiologists have sought fellowships in perioperative management, resulting in imbalance in faculty expertise in OR management amongst the professions. Previously we showed that surgical residents are able to quickly assimilate basic OR management concepts using a web-based curriculum. Here we explore opportunity costs for anesthesiologists and surgeons who seek perioperative management fellowship, advanced degrees or other management certification. **Methods:** Using Medical Group Management Association (MGMA) 2016 report we extracted median starting salaries of \$250K, \$330K, \$450K, and \$680K for Anesthesiology, Otorhinolaryngology, Orthopedic Surgery and Neurologic Surgery, respectively.³ We estimated Potential Loss of Income as difference between Median Starting Salary and Median Post Graduate Salary for a year of fellowship training (defined as 1 year of additional experience following required years of training for a specialty). We also calculated average salary for physician leaders across all organization types using the compensation survey from American Association for Physician Leadership.⁴ We estimated the Potential Loss (or Gain) of Income as difference between Median Starting Salary and Average Physician Compensation Salary. **Results:** Opportunity costs for Anesthesiologists, Otorhinolaryngologists, Orthopedic Surgeons, and Neurosurgeons are \$190,458; \$268,245; \$388,425; and \$612,833, respectively (Table 1); and potential loss (or gain) of income is (-)\$85,626; (-)\$5,626; (-)\$114,374; and (-)\$114,374, respectively (Table 3) for those who seek advanced degrees or additional management certification. **Discussion:** Surgeons and anesthesiologists need to appreciate the financial impact of a well-functioning operating room.⁴ Simply stated, costs of seeking a non-clinical, perioperative management fellowship is greater for surgeons than for anesthesiologists. Further, an additional year of fellowship training incurs costs (stipends and benefits) that ultimately are assumed by society. Medicare's payment to teaching hospitals is reduced to 50% of Direct GME payment for fellows (except Geriatrics and Preventive Medicine), leaving hospitals to shoulder remainder of costs. If a hospital is above its Medicare-imposed cap it carries entire cost. Finally, for physicians who seek additional management training or business certification, opportunity costs may be even greater and earning potential less.⁵ We acknowledge that our calculations may be overestimates because established physicians can work full-time while earning a degree, and Perioperative Management fellows can earn higher salaries by moonlighting in their respective specialties. As we struggle to create a different health care delivery platform, we must ensure that individuals involved have similar backgrounds in perioperative management. **References:** 1. Kain ZN, et al. *Anesth Analg* 2014;118(5):1126-30. 2. Garson L, et al. *Anesth Analg* 2014;118(5):1081-9. 3. <http://www.mgma.com/store/surveys-and-benchmarking/printed-reports/mgma-2016-physician-placement-starting-salary-report>. Accessed 11/29/16. 4. Esselman P. *Physician Leadership J* 2016;3(6):8-11. 5. Taheri PA, Butz DA. *Surgical Innov* 2005;12(4):365-71. 6.

Desai AM, Trillo RA, Macario A. Curr Opin Anaesthesiol 2009;22(2):191-8.

Table 1. Opportunity costs associated with seeking fellowship training. Median starting salaries for each specialty were extracted from Medical Group Management Association 2016 report. Opportunity costs for loss of potential salary were calculated by subtracting median salary of resident's fellowship year from the median starting salary for each specialty. For example, one would use median salary for post-graduate year (PGY) 5 for an anesthesiologist who just completed residency (4 years).

Specialty	MGMA	PGY	Resident	Opportunity Cost
Anesthesiology	\$250,000	5	\$59,542	\$190,458
Otorhinolaryngology	\$330,000	6	\$61,755	\$268,245
Orthopedic Surgery	\$450,000	6	\$61,755	\$388,245
Neurosurgery	\$680,000	8	\$67,167	\$612,833

Table 2. Median salaries for physician leaders were extracted from the compensation survey from American Association for Physician Leadership.

Organization Type	Median 2016
Hospital	\$315,750
Health System	\$362,951
Physician Organization	\$356,100
Academic	\$340,500
Payer and Insurance	\$302,833
Average	\$335,626

Table 3. Earning potential associated with seeking advanced management degrees or business certification. Opportunity costs were calculated by subtracting average salary from Table 2 for physician leaders. Median starting salaries for each specialty were extracted from Medical Group Management Association (MGMA) 2016 report.

Specialty	MGMA	Average	Earning Potential
Anesthesiology	\$250,000	\$335,626	\$85,626
Otorhinolaryngology	\$330,000	\$335,626	\$5,626
Orthopedic Surgery	\$450,000	\$335,626	(\$114,374)
Neurosurgery	\$680,000	\$335,626	(\$344,374)

Presentation Number: PM19

Topic 1:

1.1 Quality Improvement

Publishing Title:

Analysis of Closed Claims Data in Ambulatory Surgical Centers

Author Block:

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Abstract Body:

Introduction

The number of outpatient surgical procedures being performed in the United States has increased dramatically over the last decade (1). This growth in volume has been driven primarily by free-standing ambulatory surgical centers (ASC). Cost containment, growth of minimally invasive procedures, and patient convenience are proposed factors driving the transition in the location of surgical care. Prior studies have indicated that significant differences in patient demographics, procedure types, and reported adverse events exist between the different outpatient practice settings (2). A recent study examining closed claims data collected by The Doctor's Company, a large national malpractice insurer, demonstrated that the most frequent claims were death and nerve damage. Obesity was noted to be the

comorbidity most closely associated with closed claims (3). On the spectrum of practice settings, free-standing ASCs had the lowest death-to-claim rate (4).

Methods

The closed claims data were obtained from The Doctors Company (Napa, California), a private medical malpractice insurance company with claims data reported from 2007-2014. The study reviewed patient injuries to determine the range of outcomes that occurred when anesthesia care was provided and prompted a claim of medical malpractice.

Results

Between 2007 and 2014, a total of 944 anesthesiology claims and lawsuits were filed. Of that total, 290 (30.7%) arose from events in ASCs. These claims have a relatively large percentage of low severity injuries (33%). In comparison, the percentage of low severity claims for all physician specialties is 13%. High severity claims accounted for 19% of total claims with approximately 50% patient deaths. The most common allegation when damage to the teeth was excluded, pain, nerve damage and then death were the leading injuries. When contributing factors were identified, technical performance of procedures was a leading contributing factor followed by patient assessment issues specifically occurring in the pre-operative setting. When comorbidities were examined, 73% had no comorbidity that impacted the outcome of care. Obesity was the most common comorbidity followed by hypertension, smoking, diabetes and obstructive sleep apnea.

Discussion

Our study presents an analysis of medical malpractice closed claims occurring exclusively in the ambulatory surgical setting, providing important novel insights into the causes of patient mortality and morbidity. We describe most common patient injuries along with severity, types of procedures involved, and likely contributing factors. One of the limitations of closed claims data is the inability to draw conclusions about the prevalence of certain events in a particular setting, as not all patients who experience an adverse event will pursue litigation.

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Presentation Number: PM20

Topic 1:

1.1 Quality Improvement

Publishing Title:

Innovations in Preoperative Assessment

Author Block:

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Abstract Body:

Previously, Cleveland Clinic's 14 pre-anesthesia clinics varied in clinical protocols, practice management, resources, staffing models, and process flows. Additionally, patients were required to undergo evaluation at the facility of their surgery. Our solution was to create Pre-Anesthesia Consultation Clinics (PACC): a centralized, flexible, anesthesia-led model of preoperative care. By standardizing organizational structure and clinical practice, we improved quality and decreased variation. There were several adjustments to our improvement cycles based on feedback and metrics. Patient visits increased beyond initial projections as we added each site. The bottleneck in the new process was identified as the scheduling process and its resources. Due to staffing challenges, the mean PACC visit to surgery interval reached 2 days (goal: 14 days) resulting in patient and surgeon dissatisfaction. The abandoned call rate at the central scheduling site reflected increased volume, peaking at 18%. After improvements, abandoned calls decreased to 1.9% and the appointment to surgery interval improved. In addition, because of a delay in adding schedulers, an innovative workflow emerged: proactively prompting surgical offices to have patients contact the PACC scheduling area directly. This cooperation with surgeons' offices engaged physicians in the change process, captured patients earlier in the booking process and signaled a prompt to the schedulers. Insight into patient experience was captured by a satisfaction survey. In addition to patient experience feedback, the survey informed the team about operational efficiencies that could be improved. The anesthesia guidelines are frequently updated and publicized to keep consistent with new evidence, requiring frequent training of clinical staff (1) by PACC leadership. Integrating best practices has improved our quality of care. Pre-operative anemia and blood management protocols have been part of several carepaths that were favorably received as these spread to various PACC sites.

Since the initial pilot, the Enterprise PACC project has achieved the following:

- Completed over 53,000 preoperative visits
- No same day surgical cancellations due to inadequate PACC evaluation
- 95% patient satisfaction with scheduling a PACC visit at the patient's preferred location
- Increased the time interval from PACC appointment to surgical date to an average of 10 days
- \$1.4M in annual operating expense savings
- Developed integrated information technology infrastructure across the system

Finally, this is the first review of a preoperative clinic and multiple quality measures documented in the medical literature. Several authors have pointed to the role of patient satisfaction in quality improvement and preoperative clinics (2), however we broadened the scope of analysis in order to get a true understanding of our revamped organization (3). The PACC project measured operational and efficiency metrics as well as patient and stakeholder satisfaction.

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Presentation Number: PM21

Topic 1:

1.1 Quality Improvement

Publishing Title:

Reconsultation of Chronic Pain Patients at a Large, University-based Hospital

Author Block:

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Abstract Body:

Introduction: In an era of health care cost containment and bundling of payments, health care systems have placed increased emphasis on providing care in the most cost-efficient manner. One component of increased costs is the consultation of sub-specialists by primary medical services during inpatient admissions. These costs quickly accumulate when primary services consult subspecialists for frequently admitted patients, especially those with chronic conditions. We analyzed the number of chronic pain consultations at a large, university-based hospital to determine what number of “new consults” had been evaluated within the past twelve months. This information may help guide consultation protocols for chronic pain patients within our institution.

Methods: Fifty-four total new consults were examined in a three-month span (9/15/16-11/22/16) at our large, university-based medical center; all consults analyzed were weekday consults. QI committee approval was obtained prior to gathering data. We subsequently investigated the records of these fifty-four consults to determine if they had been evaluated as inpatients by the chronic pain team within the past twelve months. Trends were then identified among the chronic pain consult patients.

Results: Of the fifty-four patients evaluated by the chronic pain consult team, eighteen (33%) were patients who had previously been evaluated as inpatients within the past twelve months (Chart 1). While most consult patients had only previously been evaluated once or twice, three patients had nine or more chronic pain evaluations within the previous twelve months; one patient alone was evaluated five times within two months.

Discussion: Because of the frequency of reconsultations for the chronic pain service, we have started to implement changes in the response to consultations. Prior to seeing a new consult, the chronic pain fellow or nurse practitioner will first review the chart to determine whether there was a previous evaluation within the past twelve months. If so, and the condition for which the patient was admitted is a recurrent, non-chronic pain related issue (i.e. COPD flare, CHF exacerbation, etc.), our service will “curbside” the primary service and advise referring to the previous evaluation for treatment recommendations. Because our institution bills each new consult as a new consult, regardless of previous evaluation, this change in policy has had multiple positive benefits: 1.) it saves the chronic pain service time, 2.) the cost to the institution is minimized, 3.) the patient does not have to wait for treatment recommendations when they very likely mirror previous recommendations, and 4.) in a payer-provider system, such as ours, it saves on costs to the health plan. These positive effects are further magnified when patients have been evaluated many times over (patients 1, 39, 54). Such data may help us develop a more formalized protocol in assessing reconsulted patients and even serve as a framework for other subspecialties that are involved with recurrent consults.

