Anesthesiologists as Leaders in Perioperative Care

Mark S. Hausman, Jr., M.D.
Chief of Staff, VA Ann Arbor Healthcare System
Assistant Dean for Veterans Affairs, University of Michigan Medical School
Assistant Professor of Anesthesiology, University of Michigan Medical School
Objectives

1. To make the case that we can do better in delivering quality and value in US healthcare
2. To review the domains of perioperative care where Anesthesiologists may be poised to lead
3. Share several examples of effective enhanced perioperative care interventions from the literature
4. Review the experience from one federal, integrated healthcare system
The US healthcare system spends far more per capita than most

On average, other wealthy countries spend about half as much per person on health than the U.S. spends

<table>
<thead>
<tr>
<th>Country</th>
<th>Health Consumption Expenditures per Capita, U.S. dollars, PPP adjusted, 2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>$10,224</td>
</tr>
<tr>
<td>Switzerland</td>
<td>$8,009</td>
</tr>
<tr>
<td>Germany</td>
<td>$5,728</td>
</tr>
<tr>
<td>Sweden</td>
<td>$5,511</td>
</tr>
<tr>
<td>Austria</td>
<td>$5,440</td>
</tr>
<tr>
<td>Netherlands</td>
<td>$5,386</td>
</tr>
<tr>
<td>Comparable Country Average</td>
<td>$5,280</td>
</tr>
<tr>
<td>France</td>
<td>$4,902</td>
</tr>
<tr>
<td>Canada</td>
<td>$4,826</td>
</tr>
<tr>
<td>Belgium</td>
<td>$4,774</td>
</tr>
<tr>
<td>Japan</td>
<td>$4,717</td>
</tr>
<tr>
<td>Australia</td>
<td>$4,543</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>$4,246</td>
</tr>
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The US value was obtained from the 2017 National Health Expenditure data
But we are not healthier as a population

### Disease burden is higher in the U.S. than in comparable countries

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<th>Country</th>
<th>Age standardized disability adjusted life year (DALY) rate per 100,000 population, 2015</th>
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<tr>
<td>United States</td>
<td>23.104</td>
</tr>
<tr>
<td>Belgium</td>
<td>19,747</td>
</tr>
<tr>
<td>Germany</td>
<td>19,399</td>
</tr>
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<td>United Kingdom</td>
<td>19,321</td>
</tr>
<tr>
<td>Canada</td>
<td>19,119</td>
</tr>
<tr>
<td>Austria</td>
<td>18,961</td>
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<td>17,468</td>
</tr>
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<td>Japan</td>
<td>16,012</td>
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Source: Kaiser Family Foundation analysis of data from Institute for Health Metrics and Evaluation. Global Burden of Disease Study 2015 (GBD 2015) Data Downloads • Get the data • PNG
With more hospital admissions for preventable diseases

Hospital admissions for preventable diseases are more frequent in the U.S. than in comparable countries

Age standardized hospital admission rate per 100,000 population for asthma, congestive heart failure, hypertension, and diabetes, ages 15 and over, 2012

Data for Belgium, Germany, the Netherlands, and Japan are for 2011.

Surgical Care

- Surgical Care is represents approximately 40% of hospital and physician cost (500 Billion)
- When patients experience surgical complications, the cost of care nearly doubles (93%)
- Improving the quality of surgical care must be a national priority
The US Opioid Crisis

3 Waves of the Rise in Opioid Overdose Deaths

- Wave 1: Rise in Prescription Opioid Overdose Deaths
- Wave 2: Rise in Heroin Overdose Deaths
- Wave 3: Rise in Synthetic Opioid Overdose Deaths

The US Opioid Crisis

130 Americans die every day from an opioid overdose (including Rx and illicit opioids).

www.cdc.gov
New Persistent Opioid Use After Minor and Major Surgical Procedures in US Adults

Chad M. Brummett, MD; Jennifer F. Waljee, MD, MPH, MS; Jenna Goesling, PhD; Stephanie Moser, PhD; Paul Lin, MS; Michael J. Englesbe, MD; Amy S. B. Bohnert, PhD, MHS; Sachin Kheterpal, MD, MBA; Brahmajee K. Nallamothu, MD, MPH

Figure 3. Incidence of New Persistent Opioid Use by Surgical Condition

- Varicose Vein Removal
- Laparoscopic Cholecystectomy
- Laparoscopic Appendectomy
- Hemorrhoidectomy
- Thyroidectomy
- Transurethral Prostate Surgery
- Parathyroidectomy
- Carpal Tunnel
- Ventral Incisional Hernia Repair
- Colectomy
- Reflux Surgery
- Bariatric Surgery
- Hysterectomy
- Nonoperative Comparisons

Incidence of New Opioid Use, %

0 2 4 6 8 10 12 14

The Triple-Aim for Healthcare Delivery and Innovation

- Better Patient Experience
- Better Healthcare
- Lower Costs
The Triple-Aim for HealthCare Delivery and Innovation

Can perioperative care be enhanced to achieve progress along one or more of these domains?
Characteristics of Good Perioperative Care

Strategic Principles of the Perioperative Surgical Home

1. Patient Centered
   - Shared decision making
   - Patient engagement
2. Physician Led
3. Team Based
4. Evidenced-based care to reduce unexplained variability, complications and rework
5. Coordinated Care
6. Safe

The American Society of Anesthesiologists homepage: http://asahq.org
Many Stakeholders Must be Engaged around this Patient-centered Process

Patient-Centered Medical Home Team

- Physician
- Nursing Team
- Clinical Care Coordinator
- Office Staff
- Sub-Specialists
- Urgent Care Walk In Clinic
- Other Providers, Educators, Dieticians

Perioperative Surgical Home Process

- Surgery Decision
- Transitional Care
- Scheduling
- Post Care
- Pre-Optimization
- Surgical Event

The American Society of Anesthesiologists homepage: http://asahq.org
Perioperative Care Pathway

- Decision for surgery
  - Preoperative: Patient engagement, Assessment & triage, Optimization, Evidence based protocols, Education, Transitional care planning
  - Intraoperative: Right personal for patient acuity and surgery, Supply chain, Operational efficiencies, Reduced variation
  - Postoperative: Right level of care, Integrated pain management, Prevention of complications
  - Long Term Recovery: Coordination of discharge plans, Education of patients and caregivers, Transition to appropriate level of care, Rehabilitation and return to function

Supporting Microsystems:

- Human Resources
- Nursing
- Pharmacy
- Laboratory
- Radiology
- Central Supply
- Information Technology
- Social Services

Quality Improvement Database

The American Society of Anesthesiologists homepage: http://asahq.org
# Key Elements to Enhanced Perioperative Care

## Table 1. Perioperative Surgical Home Elements

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• Early preadmission assessments
• Centralized systems to gather health and other information about patients before hospital admission
• Preoperative innovations such as “prehabilitation” programs for targeted patients
• A triage system to identify which patients need to attend a preadmission clinic or program
• Use of a multidisciplinary team based clinical care processed within the hospital to coordinate preparation of patients before surgery | • Integrated pain management
• Fast-track surgery and discharge home
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• OR delay reduction techniques
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• Early postoperative mobilization by physical therapy and integrated acute-care and rehabilitation care
• Improved coordination of care from postoperative to discharge home
• Improved discharge protocol
• Increased patient and caretaker education concerning post-discharge care |
Selected Studies

• Selected, recent and relevant studies that demonstrate value to specific elements of enhanced perioperative care

• What is holding me back from implementing this at my hospital or medical center?
# Key Elements to Enhanced Perioperative Care

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Kash, BA, Cline, BM. The Perioperative Surgical Home Interview Results from 15 Selected US programs. The American Society of Anesthesiologists homepage: [http://asahq.org](http://asahq.org); 2014.
Preoperative Clinic Visits Reduce Operating Room Cancellations and Delays

Marla B. Ferschl, M.D.,* Avery Tung, M.D.,† BobbieJean Sweitzer, M.D.,‡ Dezheng Huo, M.D., Ph.D.,‡ David B. Glick, M.D., M.B.A.§

Results: A total of 6,524 eligible cases were included. In the same-day surgery suite, 98 of 1,164 (8.4%) APMC-evaluated patients were cancelled, as compared with 366 of 2,252 (16.2%) in the non-APMC group \( (P < 0.001) \). In the general operating rooms, 87 of 1,631 (5.3%) APMC-evaluated patients were cancelled, as compared with 192 of 1,477 (13.0%) patients without a clinic visit \( (P < 0.001) \). For both operating areas, APMC patients had a significantly earlier room entry time than patients not evaluated in the APMC.

Conclusions: An evaluation in the APMC can significantly impact case cancellations and delays on the day of surgery.
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• Increased patient and caretaker education concerning post-discharge care |

Taking Control of Your Surgery: Impact of a Prehabilitation Program on Major Abdominal Surgery

Ryan Howard, MD, Yue S Yin, BS, Lane McCandless, BS, Stewart Wang, MD, FACS, Michael Englesbe, MD, FACS, David Machado-Aranda, MD, FACS

- Michigan Surgical Health Optimization Program (MSSHOP):
- Pre-surgical patients often highly compliant
- Benefit of patient-physician partnership, active participation in care
- Previously shown to hasten return to baseline function and associated with a reduction in postoperative complications
- This study examines clinical and economic benefit of prehabilitation
MSHOP Pre-habilitation

- Physical activity – walking with pedometer and target steps per day
- Pulmonary rehabilitation – IS with instructions and goals
- Nutrition optimization
- Stress reduction
- Smoking cessation
- Minimal 2 week participation
- Phone calls, text and email prompts/reminders

Results: Beneficial Physiological Effects, Fewer Complications and Lower Cost

Table 4. Clinical Outcomes and Cost

<table>
<thead>
<tr>
<th>Outcome</th>
<th>MSHOP (n = 40)</th>
<th>Elective (n = 76)</th>
<th>Emergency (n = 40)</th>
<th>p Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU admission, %</td>
<td>0</td>
<td>2.70</td>
<td>47.50</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Blood product administration, %</td>
<td>0</td>
<td>1.30</td>
<td>15.00</td>
<td>0.001</td>
</tr>
<tr>
<td>Length of stay, d, mean (SD)</td>
<td>7.6 (5.5)</td>
<td>7.6 (7.2)</td>
<td>11.9 (6.8)</td>
<td>0.003</td>
</tr>
<tr>
<td>Readmission, %</td>
<td>23</td>
<td>18</td>
<td>22</td>
<td>0.737</td>
</tr>
<tr>
<td>Complication, %</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>70.0</td>
<td>61.3</td>
<td>52.5</td>
<td>0.050</td>
</tr>
<tr>
<td>Minor</td>
<td>17.5</td>
<td>21.3</td>
<td>22.5</td>
<td></td>
</tr>
<tr>
<td>Major</td>
<td>10.0</td>
<td>16.0</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>Death</td>
<td>2.5</td>
<td>1.3</td>
<td>15.0</td>
<td></td>
</tr>
<tr>
<td>Mortality</td>
<td>2.5</td>
<td>1.3</td>
<td>15.0</td>
<td>0.005</td>
</tr>
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<td>Total charge, $, mean (SD)</td>
<td>75,493.97 (55,151.21)</td>
<td>97,439.88 (100,377.06)</td>
<td>166,085.44 (124,394.84)</td>
<td>0.001</td>
</tr>
<tr>
<td>System charge, $, mean (SD)</td>
<td>67,083.97 (50,409.17)</td>
<td>82,198.04 (93,538.02)</td>
<td>144,858.53 (113,169.23)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Professional charge, $, mean (SD)</td>
<td>11,038.12 (5,861.32)</td>
<td>15,249.84 (9,238.38)</td>
<td>21,226.89 (12,552.24)</td>
<td>&lt;0.001</td>
</tr>
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### Surgical Site Infection Prevention Checklist

<table>
<thead>
<tr>
<th>MSQC SSI Prevention Measures</th>
<th>✔</th>
<th>✗</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appropriate (SCIP-2) selection of intravenous prophylactic antibiotics</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Postoperative normothermia (Temp &gt;98.6F)</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Oral antibiotics with mechanical bowel prep</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Postoperative day 1 glucose less than or equal to 140 mg/dl</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Minimally invasive surgery</td>
<td>✔</td>
<td>✗</td>
</tr>
<tr>
<td>Short operative duration (Incision to closure) &lt;100 min</td>
<td>✔</td>
<td>✗</td>
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**Fig 1.** Michigan Surgical Quality Collaborative (MSQC) surgical site infection\(^6\) prevention measure checklist.

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Bundled perioperative interventions: the more complete the bundle, the lower incidence of SSI

Fig 2. Risk-stratified surgical site infection (SSI) rate as a function of the number of SSI prevention measures followed (appropriate Surgical Care Improvement Project-2 antibiotics, postoperative normothermia, oral antibiotics with bowel preparation, perioperative glycemic control, minimally invasive surgery, and short operative duration).

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Creation and Execution of a Novel Anesthesia Perioperative Care Service at a Veterans Affairs Hospital

Bret D. Alvis, MD,*† Adam B. King, MD,*† Pratik P Pandharipande, MD, MSCI,*† Liza M. Weavind, MD,*† Katelin Avila, NP‡ Philip J. Leisy, MD,*† Muhammad Ajmal, MD,§ Michael McHugh, MD,‖ Kirk A. Keegan, MD,¶# David A. Baker, MD, MBA,** Ann Walia, MD,*† and Christopher G. Hughes, MD*†
Alvis, et al. PSH concept at Tennessee Valley VA

**Presurgical Period**
- **SURGERY**
  - Schedule for surgery
  - Order necessary pre-operative labs, appointments, therapies, anesthesia pre-operative clinic appointment
  - Place PCS consult

- **PCS**
  - Identify the consult
  - Evaluate and confirm preoperative surgical orders
  - Confirm the necessary preoperative social work is complete
  - Call patient, surgeon, social worker, or anesthesiologist, as needed, to make sure all evaluations can be done or prior to surgery

**Preoperative**
- **SURGERY**
  - Confirms pre-operative orders on arrival
  - Give patient preoperative multimodal analgesia
  - IV fluids given based on fluid challenge techniques not pre-determined calculations
  - Anesthesiologist observes a low opioid technique with multimodal analgesia regimen

- **PCS**
  - Anesthesiology confirms with PCS team the ERAS pathway of the patient
  - Perform regional technique per ERAS pathway
  - Use balanced IV solutions
  - Anesthesiologist observes a low-tidal volume ventilation strategy

**Intraoperative**
- **SURGERY**
  - Continue multimodal pain regimen
  - No narcotic PCA
  - Order an early diet
  - Perform early ambulation
  - Multiple daily interactions with social work

- **PCS**
  - No routine labs (only based on consensus need)
  - Daily PharmD involvement

**Postoperative**
- **SURGERY**
  - Schedules patient for follow-up appointment
  - Writes the discharge summary
  - Confirms medicines reconciled with patient by PCS and PharmD

- **PCS**
  - Helps with discharge orders (writes prescription for their multimodal pain medicines)
  - Confirms medicine reconciliation with PharmD
  - Confirms postdischarge surgical and primary care physician appointments
  - Confirms social work and physical therapy orders are complete and accurate
  - Calls patient on days 3 and 7 for follow-up

---
The Tennessee Valley VA model succeeded in LOS reduction.

Role of the Perioperative Surgical Home in Optimizing the Perioperative Use of Opioids

Thomas R. Vetter, MD, MPH,* and Zeev N. Kain, MD, MBA, FAAP†

Transitional Pain Service: The Missing and Needed Linkage

“A soft place to land” for patients at increased risk of long-term, increasing, excessive opioid consumption and/or developing chronic post-surgical pain

OUTPATIENT TRANSITIONAL PAIN SERVICE CLINIC*

Surgery and Anesthesia

Acute Pain Service

INPATIENT TRANSITIONAL PAIN SERVICE

OUTPATIENT TRANSITIONAL PAIN SERVICE CLINIC

Primary Care Practice

Greatly improved continuum of care and perioperative pain management

*Preoperatively for elective & urgent surgical procedures
The Perioperative Surgical Home: Improving the Value and Quality of Care in Total Joint Replacement

George F. Chimento¹,² · Leslie C. Thomas²,³

Implementation of a perioperative surgical home protocol for pediatric patients presenting for adenoidectomy

Vidya T. Raman a, b, *, Dmitry Tumin a, Joshua Uffman a, b, Arlyne K. Thung a, b, Candice Burrier a, b, Kris R. Jatana c, Charles Elmaraghy c, Joseph D. Tobias a, b

Implementing a Pediatric Perioperative Surgical Home Integrated Care Coordination Pathway for Laryngeal Cleft Repair

Izabela Leahy, MS,*† Connor Johnson, BS,* Steven J. Staffa, MS,* Reza Rahbar, MD, DMD,†‡ and Lynne R. Ferrari, MD*†

Enhanced Recovery After Shoulder Arthroplasty

Taras Grosh, MD*, Nabil M. Elkassabany, MD, MSCE
Experience from the VA Ann Arbor Healthcare System

- 142 bed tertiary care hospital
- 69,000 uniques
- 4500-5000 surgical cases
- High surgical complexity
Perioperative Services

Preoperative period

- Evidence-based pre-op testing (laboratory, cardiac, radiology)
- Enhanced patient education/counseling
- Pain/opioid management and intervention
- Patient optimization (ambulation, IS, nutrition, stress reduction, smoking/alcohol cessation)
- Standardized VTE and antibiotic prophylaxis
- Standardized clearance process and criteria

Intraoperative period

- Neuraxial/regional anesthesia/analgesia
- Protocol for glycemic control
- Evidence-based ventilator management
- Protocol for normothermia measures
- Goal directed fluid therapy
- Standardized antiemetic therapy
- Evidence based, multimodal pain control

Postoperative period

- Appropriate level of care (ICU, PC, tele, floor, ambulatory)
- Capability building specific to level of care
- Early mobilization
- Early nutrition
- Delirium prevention strategies
- Timely removal of lines/catheters
- Minimize opioid medication (multimodal pain control)

Initiatives based on reported ERAS, MSQC, MSHOP, and ASPIRE performance data; **bold** = work underway
Aims for Delivery

Quality of Care
- Shorter LOS
- Fewer complications/better outcomes
- Pain control
- Opioid reduction

Efficiency/cost savings
- Reduced preoperative testing
  - Cardiology clinic
- Reduced same day cancellation
- Reduced LOS

Patient Experience
- Enhanced education and engagement
- Better pain control
- Earlier return to preoperative level of function
- Greater trust
Implementation Efforts to date: The PREPARE clinic

- Hospitalist-Anesthesiologist staffing model
- At present see approximately 10% of pre-surgical patients (based on established triggers)
  - Blend of electronic consults and F2F
- Evidence based, protocol driven
  - Assessment and appropriate pre-surgical testing
  - Early pre-habilitation
- Active management and planning
  - Complex pain patients (e.g. OUD/SUD/Suboxone)
  - HTN, DM, HF
  - Anesthesia planning
The PREPARE clinic

• Developed documentation and decision support tool that is scalable to all surgery clinics
  • Patient education element
  • Standardized care: antibiotics, VTE, pre-operative medication management

• Results to date:
  • Reduction in same day cancellation
    • 7.3% to 5.7% year over year
    • PREPARE patients 4%, zero preventable
  • Reduction in wound infection
The Acute Pain Service

Development and Implementation of an Acute Pain Service at the VA Ann Arbor

Sam Lahidji, MD, Director, APS; Mark S. Hausman, Jr., MD, Chief, Anesthesiology and Perioperative Care Service, VA Ann Arbor Healthcare System

Pre-op
- PREPARE collaboration
- Coordination with pain medication prescribers
- Guiding opioid tapers
- Coordination with substance abuse providers

Peri-op
- Regional anesthesia/analgesia program
- Epidural analgesia therapy
- Multimodal analgesia
- Build evidence based pathways for anesthesia/analgesia with surgeons

Post-op acute care
- Daily rounds
- Primary providers for pain management for epidural, peripheral nerve catheter and orthopedic patients
- Champion multimodal analgesia, early mobility

Post-discharge
- Telephone follow-up
- Pain Clinic referral if indicated
- Standardize post-acute care analgesia
- Consult for difficult to manage post-acute care pain
Summary

• We can and must do better to improve along the quality, efficiency and experience spectrum

• Perioperative care is fertile ground for meaningful process improvement efforts, supported by evidence, which anesthesiologists are poised to lead

• What is holding you back?
Questions and Discussion