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### Session Takeaways

- Dashboards for your providers across multiple quality domains
- Review an early warning system for key medical conditions
- Learn about iCare, an emergency decision support system
- Integrate your EMR with hospital and national QI systems

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### Triple Aim and Quality Improvement

The Domains of Healthcare Quality

- Equitable
- Efficient
- Timely
- Patient Centered
- Effective
- Safe

Population Health    Patient Experience    Cost of Care

**Triple Aim**

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### Dashboards: *The Case for Data*

- Physicians want to do the right thing  
But don't know where they are relative to others
- Need data – usually work alone in a vacuum  
Can't see how others are succeeding or where we are
- Peer Pressure - highly motivational  
May be the most effective change factor, no one wants to be at the bottom of the scale
- Learn from those doing it better  
Still have a lot to learn – this is real time improvement
- Identify those who need more help  
Those at the lower end can be identified and coached

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### Dashboards: *Requirements for Success*

- Accurate  
Physicians will search for inaccuracy and perceived excuses
- Real Time  
Need to be able to see the effect of interventions
- Reliable  
Metric cannot change over time, upgrades cannot reset system
- Available  
Must be easy to find and use

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### Dashboards: *What to consider tracking*

- ASA Score Summaries
- Anesthesia Start to Ready Times (by Service)
- Airway placement, Line placement, Block placement
- PACU recovery times, pain scores, opioid administration
- OPPE Metrics
- Emergence Agitation
- Nausea / Vomiting
- Efficiency Metrics
- Block Utilization
- Room Utilization
- Case Volume
- Cancellations
- Room Turnover
- Percent of First Case Late Starts

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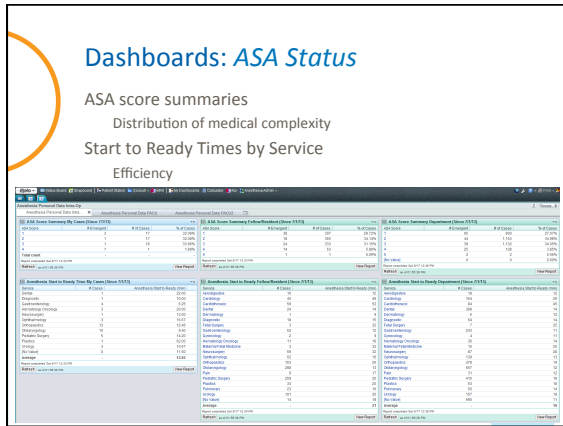
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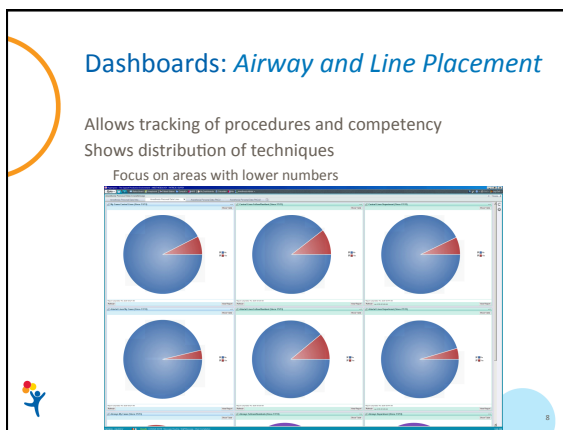
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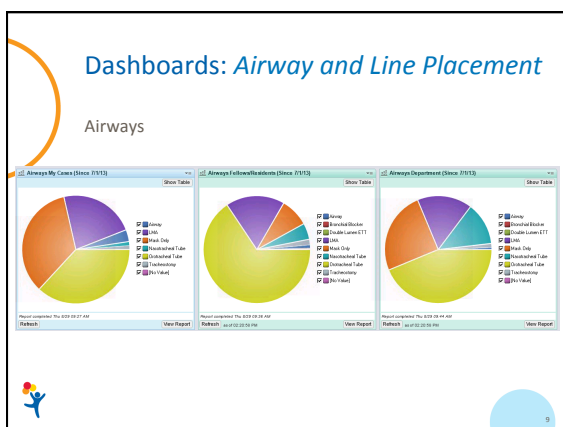
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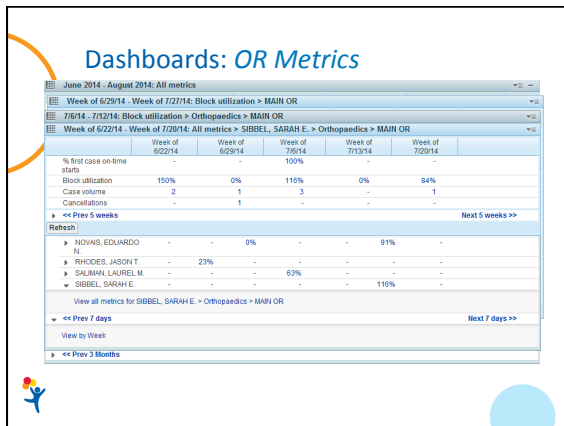
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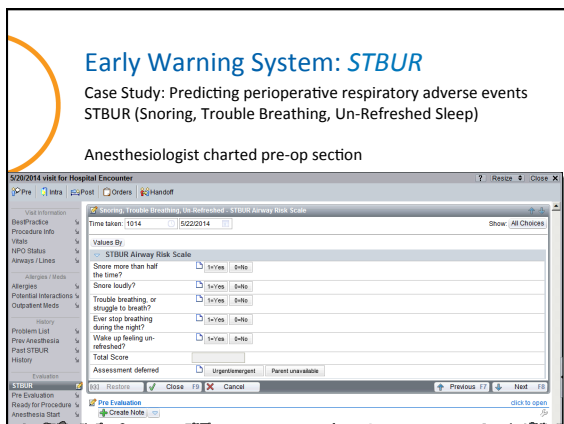
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## Early Warning System: *Braden Q*

Case study: Braden Q – Risk of pressure ulcer

Nurse entered assessment in the admission encounter

The screenshot shows the Braden Q assessment interface. The 'Braden Q Scale' section lists various mobility and sensory items with scores. The 'Total Score' is 10, which is highlighted in red. A 'Value Information' box on the right explains the score: '10-12 = High risk or high risk for skin breakdown. Monitor skin every 2 hours and use pressure-reducing devices.' Below this, a 'Row Information' box states: '10-12 = High risk or high risk for skin breakdown. Monitor skin every 2 hours and use pressure-reducing devices.'

## Early Warning System: *Display*

The screenshot displays the 'Early Warning System' interface. It shows patient information: 'Zetrest, Anesthesia <143814> Male - 21 month old - 12/03/11'. The 'Braden Q' score is 10 at 09:15:00. The 'Periop Respiratory Adverse Event Risk' is 5 at 09:15:00. A red arrow points to the 'Braden Q' score field. The interface also includes a 'Caution & Warning' section with a 'Checklist' and a 'TURBATE REDUCTION (N/A Notes)' section.

## Early Warning System: *Reports*

The screenshot shows the 'Early Warning System: Reports' interface. It displays two columns of reports: 'Braden Q score of 17-22 (Moderate Risk)' and 'Braden Q score of 16 or less (High Risk)'. The 'Moderate Risk' report includes instructions: 'Pad appropriately under all devices', 'Offload extremities and bony prominences', 'Utilize gel positioning devices and Z-flos appropriately', and 'Apply Mepilex border dressings over bony prominences for procedures over 2 hrs. (including sacrum)'. The 'High Risk' report includes instructions: 'Order Specialty Bed (See specialty bed algorithm / Bed tech. #7-2013)', 'Offload extremities and bony prominences', 'Pad appropriately under all devices', 'Utilize gel positioning and Z-flos appropriate', and 'Apply Mepilex border dressings over bony prominences (including sacrum)'. A 'Caution & Warning' section on the right provides additional guidance.

**iCare**

Emergency Decision Support in AIMS system

Common anesthesia emergencies  
Calculates drug doses automatically  
Real time guidance

Same report format can be used for protocols

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**iCare: Integration with intraop**

The screenshot displays the iCare software interface integrated with intraoperative monitoring. It shows a patient's vital signs (Heart rate, Blood pressure, SpO2, etc.) and a waveform graph representing a physiological parameter over time. The interface includes various tabs and buttons for navigation and data management.

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**iCare: Example Report**

**Pulseless Arrest: Ventricular Tachycardia/Fibrillation**

Emergency	Ventricular Tachycardia	Ventricular Fibrillation
<ul style="list-style-type: none"> <li>Inform OR team and call for help</li> <li>Call for code cart and defibrillator</li> <li>Discontinue anesthesia and go to 100% O<sub>2</sub></li> </ul>		
<b>1) START High Quality CPR</b> Push hard (greater than 1/3 AP Chest diameter) Push Fast (100/min, allow recoil) Minimize interruptions Rotate compressor every 2 minutes Assess quality (ETCO <sub>2</sub> greater than 10, art diastolic greater than 20)	<b>2) Defibrillate</b> Turn on defibrillator, attach pads Shock at 100-2 J (2 Joules/kg) May repeat up to 2 J (2 J/kg)	<b>3) Prepare Medications</b> <b>Epinephrine</b> 0.51 mg (10 mg/kg) IV 0.5 mg of 1:10K concentration (0.1 mL / kg) <b>Amiodarone</b> 5.3 mg (0.1 mg/kg) ETT 265.5 mg (5 mg/kg) IV May repeat x 2 for refractory pulseless VF/VT
<b>Management</b> Start CPR → Attach pads → Shock if VF/pVT → resume CPR 2 min → IV or IO and ETT access → give Epinephrine → cycle every 2 min pulse check, rhythm check, and switch CPR providers q 2 min Go to PRN-Arrest algorithm if rhythm is not shockable		
<b>Most Reversible Causes:</b> H's: Hypovolemia, hypoxia, hypoxigen ions (acidosis), hypoglycemia, hypothermia, hypotension T's: Tension Pneumothorax, Tamponade (cardiac), Thrombosis (pulmonary and coronary), Toxins		
<a href="#">Click here to access additional information and relevant journal articles</a>		
Weight used for calculations: 53.1 kg		

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## Event Reporting

Event and Outcome capture  
Review cases in M&M process  
Drive system based improvement

Two ways to integrate  
Hospital Systems  
Anesthesia Quality Institute

Can't fix what we don't know about

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### Event Reporting: *Hospital System*

**AIRS - Anesthesiology Only**  
All text fields are required. Mark fields are optional. If you require assistance with this application, call 2009 Help Desk at 730.777.6123.

**General Incident Information**

Classification of Person/Location Affected: [Please specify] [23] [0]  
Hospital Classification of Event: [Please specify] [23] [0]  
MEDICAL Equipment/Supplies Involved/Not Involved: [Please specify] [23] [0]  
Are you an Anesthesiologist, Anesthetist? [23] [0]

**Person Affected**

Last Name: JZTST [0]  
First Name: PABT [0]  
Enter M&M & Click Search to Populate Name: [0] Search [0]  
DOB: 06/22/2013 [0] [0] (mm/dd/yyyy)  
Age: 1 year(s) [0]

**Incident Details**

File Attachments: [0]  
Attach [0]

Event Date: [0] [0] (mm/dd/yyyy)  
Location Where Event Occurred: [Please specify] [23] [0]  
Department/Unit Reporting Event: [Please specify] [23] [0]  
Please specify: [0]

Macrg Meds  
Lines Airways  
Blood Blocks  
Staff Attgnt  
Assess Equip  
JJO Q Note  
Resp Graph  
Monitor Billing  
Pre Post  
Orders Handoff  
Sign-in Sidebar  
AIRS Record

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### Event Reporting: *AQI*

**AQI ANESTHESIA INCIDENT REPORTING SYSTEM (AIRS)**  
The University of Colorado

Ten most common reported events in Operating Room

Laryngospasm	Medication Error Syringe Swap	Medication Error Wrong Drug	Equipment Failure	Damage to teeth or gums
Corneal Abrasion	Blind AIO	Hypotension	Cardiac Arrest	Failed Regional Block

Report Incident Not Listed Above

Report Now [0] Remind me later [0]

Report that no incident occurred during this anesthetic

No Incident or Near Miss Occurred [0]

Macrg Meds  
Lines Airways  
Blood Blocks  
Staff Attgnt  
Assess Equip  
JJO Q Note  
Resp Graph  
Monitor Billing  
Pre Post  
Orders Handoff  
Sign-in Sidebar  
AIRS Record

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**AQI** **ANESTHESIA INCIDENT REPORTING SYSTEM (AIRS)**

Use only the navigation buttons provided. Please do not use your browser's Back, Forward, or Refresh buttons.

**Describe**

Patient: Female  
 Age: 18 to 34 years  
 Habitus: Normal (BMI 18.5 - 25)  
 ASA Physical Status: I E  
 Area: OR  
 Time Incident Occurred: Evening (4PM-10PM)  
 Anesthesia Staffing: Immediate Provider: Anesthesia Resident, Supervising Provider: Anesthesiologist, Other Provider: -- None --  
 Procedural Service Involved: Trauma Surgery

Was this event impacted by a drug shortage? ☐ Yes ☒ No  
 Is this a case of respiratory depression? ☐ Yes ☒ No

**Incident Description**  
Please include as much detailed information as possible.

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**AQI** **ANESTHESIA INCIDENT REPORTING SYSTEM (AIRS)**

Use only the navigation buttons provided. Please do not use your browser's Back, Forward, or Refresh buttons.

**Classify**

Use the list boxes below to properly classify the incident. You may use the 'Add Another Classification' button to add as many as necessary.

Category	Subcategory	Type
Administrative	Acidosis	Delay
Always Management	Blood bank	Mistake
Anesthetic/Operative Complications	Blood loss	Other
Blood	Hyperglycemia	
Cardiac	Hyperkalemia	
Documentation	Hyperlactemia	
Equipment	Hypoglycemia	
Immunological	Transfusion reaction	
Infrastructure/System	Type specific blood unavailable	
Medication	Uncontrolled coagulopathy	
Mortality	Unexpected transfusion	
Neuro	Other	
Pulmonary/Respiratory		
Regional Anesthesia		

**Add Another Classification**

**Level of Harm to Patient (per AIHO Scale):**

- ☐ Unsafe Condition - Any circumstance that increases the probability of a patient safety event.
- ☐ Near Miss - Event occurred but did not reach patient.
- ☐ No Harm - Reached patient, but no harm was evident.
- ☐ Emotional Distress or Inconvenience - Mild and transient anxiety, pain, or physical discomfort.
- ☐ Additional Treatment - Injury limited to additional intervention during admission but no other injury.
- ☐ Temporary Harm - Bodily or psychological injury, but likely not permanent.
- ☐ Permanent Harm - Lifelong bodily or psychological injury or increased susceptibility to disease.
- ☐ Severe Permanent Harm - Severe lifelong bodily or psychological injury or disfigurement.
- ☐ Death - Death at the time of the assessment.

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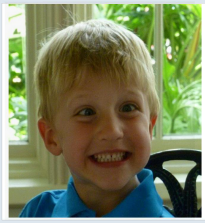

**Preventing Harm: Anesthesia Sign-In**

**Anesthesia Sign-In - Performed By Anesthesiologist Before Induction in Room**

**Anesthesiologist & Circulator Verify:**

- 1) Patient Identification (Two identifiers - first & last name, MRN)**  
Anesthesia Zine (DOB: 12/3/2011, Sex: male)  
MRN: 1438141  
Check armband and consent  
Verify with family, if applicable
- 2) Procedure and Anesthetic**  
Inguinal Torsion Removal - Bilateral - Toe  
Verify on consent  
State anesthetic technique  
Discuss regional block(s) and check for block/surgical site mark(s)  
Blood consent signed, if applicable
- 3) Weight and Allergies**  
Weight: 13.4 kg  
Allergies: Review of patient's allergies indicates no known allergies
- 4) Verify information against whiteboard**

In room time: 1649


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## Anesthesia Protocols

- Use your AIMs system to standardize provider performance
  - Pre-op: Review and acknowledge protocol
  - Intra-op: Use scripting (Macros, Reminders) as cognitive aids
  - Post-op: Make the performance data available
    - Self Serve Analytics
- Change Management
  - Opt-In model vs Department / Service line requirement
  - Assigned person accountable for cases
  - Review data with providers



## Protocols

**Pre-operative**

**Setup**  
Standard IV bag, EnFlow, Transducer, Infusion pumps, spinal needle and introducer  
2 large bore IVs, arterial line, +/- central line. All HIGH RISK PATHWAY patients get a central line.

**Pre-medications**  
Analgesia (ordered by surgeons, if indicated): Acetaminophen: PO tablet or elixir  
Gabapentin: PO tablet or elixir  
Vancomycin pre-meds (ordered by surgeons, if needed): Rantidine: PO tablet if patient takes pills, otherwise IV  
Diphenhydramine: PO tablet if patient takes pills, otherwise IV

**Aniolyis (ordered by anesthesiologist, if needed):** Midazolam: 0.3-0.5 mg/kg PO, maximum 20 mg

**PSF Pre-op orderset**

**Quick Reference Doses:**  
Transverse acid (TAA): 10 mg/kg bolus over 15 minutes, then 5 mg/kg/hr  
IT morphine: 7.5 mcg/kg (maximum 500 mcg), if patient has OSA/sleep spO2 < 85% 5 mcg/kg (maximum 350 mcg)  
Call APS x75433 to alert them about dose and timing of IT morphine

**Vancomycin:** 15 mg/kg (re-dose for EBL is 7.5 mg/kg) START in the operating room. Infuse over 60 minutes  
**Cefazolin:** 25 mg/kg (re-dose for EBL is 12.5 mg/kg) Give Cefazolin after flipping prone  
**Ceftriaxone:** 50 mg/kg (re-dose for EBL is 25 mg/kg) Give Ceftriaxone after flipping prone

**Maintenance phase:**

**Emergence phase:**

**Transfusion Management:**

**Acknowledge Protocol**  
Acknowledged Protocol - Filed on 12/17/14 at 1541 by Guffey, Patrick J.



## Protocols

**Intraoperative**

**Induction phase:**

- Inhalational vs. IV induction, PV(send T&C), OETT, bite blocks, OGT, temp probe, tegaderm eyes. **START VANIC**

**Access phase:**

- Two large bore IVs, arterial line, +/- central line, IT morphine

**Maintenance phase:**

- Start antithrombotic
- Total intravenous anesthetic (TIVA) with propofol and remifentanyl or fentanyl infusions
- Consider adding ketamine infusion (0.1-0.4 mg/kg/hr)
- Do not use volatile anesthetics during the maintenance phase, per neuromonitoring request
- Keep MAP within 15% of baseline during exposure/instrumentation, increase to at least 65 mmHg before correction

**Emergence phase:**

- DIC ketamine when rods are in
- Prepare for emergence
- Ketorolac (ask surgeon)
- Disposition

**Transfusion Management:**

- Calculate Estimated Blood Volume (70 mL/kg) and allowable blood loss. Anticipate what EBL will correlate with losing HALF a blood volume, for antibiotic redosing planning
- Have packed RBCs ready in the OR fridge
- Discuss ordering FFP with your attending

**Acknowledge Protocol**  
Acknowledged Protocol - Filed on 12/17/14 at 1541 by Guffey, Patrick J.





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