The ABCs of Analgesia and Sedation in the Critically Ill Patient

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University Health System
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Conflicts of interest

- Nothing to disclose
Pharmacist Objectives

° List components of the ABCDEF bundle

° Describe analgosedation and supporting evidence

° Formulate a therapeutic plan for analgesia and sedation of a critically ill patient utilizing best practice therapies
Pharmacy Technician Objectives

- List components of the ABCDEF bundle

- Describe adverse effects of opiates when used as analgosedation

- Identify dexmedetomidine and propofol as first line therapies for sedation in critically ill patients
Critical Illness

- Advancement in critical care medicine has improved survival

- Generalized weakness and fatigue
- Decreased mobility
- Anxious or depressed mood
- Cognitive impairment
- Sleep disturbances
- Sexual dysfunction

Post-Intensive Care Syndrome (PICS)

Cognitive

Physical Ability

Emotional

Mental Health

PICS Testimonial

“I had septic shock 4 years ago from urosepsis and I'm in my 50s. I am writing because I have never felt like myself again. I can't think clearly, my memory has suffered, I am fatigued like never before. Before sepsis I was active, hiking, biking, rock climbing, and running.”

- ICU Survivor

https://www.icudelirium.org/patients-and-families/patient-testimonials
"I was hospitalized for 9 days with respiratory problems. I could not remember 8 family members that were there. I also told the medical staff to call “Rick” (my husband who passed away 11 years ago).

After I went home, someone slept with me for the first two weeks. I also forgot that my sister had passed away over a year ago. I could not use the TV remote, microwave, or air conditioner/heater. I left boiling water on the stove while I fell asleep for 3 hours. I drove my car at night and had trouble finding my way home."

- ICU Survivor
“It is during our darkest moments that we must focus to see the light.”

- Aristotle
How do we treat PICS?

Prevention > Cure
How do we prevent PICS?
ABCDEF Bundle

- Multicomponent ICU intervention
- Goal → produce patients who are awake, cognitively engaged, and physically active
- Applicable to every patient regardless of mechanical ventilation or admitting diagnosis
ICU Liberation Collaborative

- Observational study of 15,226 ICU patients
ABCDEF Bundle

Patient

A
B
C
D
E
F
Patient A
Assessment, Prevention, Management of Pain

Patient
Pain in the Intensive Care Unit

- 50%–80% of ICU patients report pain as “uncontrolled”
- Critically ill experience moderate-to-severe pain at rest and during standard procedures

Acute Effects of Pain
- Hypercatabolic state
- Decreased tissue perfusion
- Impaired wound healing
- Impaired immune response

Long-term Consequences of Pain
- Decreased health-related quality of life
- Chronic pain
- Posttraumatic stress disorder

Pain Assessment

Patients who can communicate

- Numeric rating scale

Patients unable to communicate

- Behavioral Pain Scale
- Critical-Care Pain Observation Tool (CPOT)

≥ 3 = PAIN

Facial expression
- Relaxed: 0
- Tense: 1
- Grimacing: 2

Body movements
- No movements: 0
- Protection: 1
- Restlessness: 2

Muscle tension
- Relaxed: 0
- Tense: 1
- Rigid: 2

Ventilator compliance
- Tolerating ventilator: 0
- Coughing: 1
- Fighting ventilator: 2
What is the optimal approach to analgesia?

- Opioid
- Non-opioid Analgesic
- Multimodal pain control

Result: Analgosedation
Analgosedation

Analgesia-first sedation
Use of opiate before sedative

Analgesia-based sedation
Use of opiate instead of sedative

↓ Time to wean from mechanical ventilation
↓ Duration of mechanical ventilation
↓ ICU length of stay
↓ Mortality?
Analgosedation

- Breen et al (N=105)

\[ P = 0.033 \]
Fig. 2. Meta-analysis of the association between analgosedation and ICU mortality.
Fentanyl: hardest working drug in the ICU

**Mechanism of Action**
Mu opioid agonist

**Pharmacokinetics**
- Onset: 1-2 min
- T1/2: 2-4 hours
- Duration: 0.5 – 1 hour
- Metabolism: CYP3A4/5

**Dose**
- Continuous infusion: 0.7-10 mcg/kg/hr
- Intermittent bolus: 0.3-1 mcg/kg/dose q1 hr

**Efficacy**
- Limited monotherapy data
- Component of treatment in landmark trials

**Adverse Effects**
- Respiratory depression, constipation
- Chest wall rigidity

<table>
<thead>
<tr>
<th>Adjunct Analgesics in Mechanically Ventilated Adults</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mechanism of Action</strong></td>
</tr>
<tr>
<td>--------------------------</td>
</tr>
<tr>
<td>Acetaminophen</td>
</tr>
<tr>
<td>Gabapentin</td>
</tr>
<tr>
<td>Dexmedetomidine</td>
</tr>
<tr>
<td>Ketamine</td>
</tr>
</tbody>
</table>
What is best practice for sedation?

Analgesia-first sedation
+ Multimodal Pain control

Analgesia-based sedation
+ Multimodal Pain control

Sedative of Choice?
Patient

Choice of Sedation and Analgesia

A
Sedation Assessment

- Subjective sedation scales are most valid and reliable
- Measure depth and quality of sedation
- Richmond Agitation-Sedation Scale (RASS)
- Sedation-Agitation Scale (SAS)
## RASS Score

<table>
<thead>
<tr>
<th>Score</th>
<th>Term</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>+4</td>
<td>Combative</td>
<td>Overtly combative, violent, immediate danger to staff</td>
</tr>
<tr>
<td>+3</td>
<td>Very agitated</td>
<td>Pulls or removes tubes or catheters; aggressive</td>
</tr>
<tr>
<td>+2</td>
<td>Agitated</td>
<td>Frequent non-purposeful movements, fights ventilator</td>
</tr>
<tr>
<td>+1</td>
<td>Restless</td>
<td>Anxious but movements not aggressive vigorous</td>
</tr>
<tr>
<td>0</td>
<td>Alert and calm</td>
<td></td>
</tr>
<tr>
<td>-1</td>
<td>Drowsy</td>
<td>Not fully alert, but has sustained awakening (eye-opening/eye contact) to voice (<em>≥ 10 seconds</em>)</td>
</tr>
<tr>
<td>-2</td>
<td>Light sedation</td>
<td>Briefly awakens with eye contact to voice (<em>&lt;10 seconds</em>)</td>
</tr>
<tr>
<td>-3</td>
<td>Moderate sedation</td>
<td>Movement or eye opening to voice (<em>but no eye contact</em>)</td>
</tr>
<tr>
<td>-4</td>
<td>Deep sedation</td>
<td>No response to voice, movement or eye opening to physical stimulation</td>
</tr>
<tr>
<td>-5</td>
<td>Unarousable</td>
<td>No response to voice or physical stimulation</td>
</tr>
</tbody>
</table>
What is the optimal depth of sedation?

- Light sedation > deep sedation using nursing protocols
- No universal definition of light sedation
  - RASS: +1 to -2
- Light sedation
  - ↓ Mortality
  - ↓ Mechanical ventilation days
  - ↓ ICU days
  - ↓ Delirium

**Dexmedetomidine (DEX)**

### Mechanism of Action
- $\alpha_2$ receptor agonist

### Pharmacokinetics
- **Onset:** 15 mins
- **Peak:** 1 hr
- **Duration:** 3-4 hours

### Dose
- **Loading dose:** not recommended
- **Infusion:** 0.2-1.5 mcg/kg/hr

### Efficacy
- ↓ Delirium
- ↓ Time to extubation

### Adverse Effects
- • Hypotension
- • Bradycardia

---

Landmark Trials: Dexmedetomidine

MENDS (N=103)
- DB, RCT adult medical/surgical ICU patients w/ MV > 24 hrs
- DEX vs Lorazepam

<table>
<thead>
<tr>
<th>Efficacy Outcomes</th>
<th>Safety Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delirium &amp; Coma-free days: 7 (1-10) vs 3 (1-6), p=0.01</td>
<td>HR &lt; 60 BPM: 17% vs 4%, p=0.03</td>
</tr>
<tr>
<td>MV-free days: 22 vs 18, NS</td>
<td>SBP &lt; 80 mmHg: 13 (25%) vs 10 (20%), NS</td>
</tr>
<tr>
<td>ICU LOS: 7.5 vs 9, NS</td>
<td>Self-extubation: 4 (8%) vs 2 (4%), NS</td>
</tr>
<tr>
<td>28-day mortality: 9 vs 14, NS</td>
<td></td>
</tr>
</tbody>
</table>
Landmark Trials: Dexmedetomidine

° SEDCOM (N=366)
  • DB, RCT of adult ICU patients w/ MV < 96 hrs
  • DEX vs Midazolam

<table>
<thead>
<tr>
<th>Efficacy Outcomes</th>
<th>Safety Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delirium: 54% vs 76%, p &lt;0.001</td>
<td>Bradycardia: 42% vs 19%, p&lt;0.001</td>
</tr>
<tr>
<td>Time to extubation: 3.7 vs 5.6 days, p=0.01</td>
<td>HR &gt; 130 BPM: 25% vs 44%, p&lt;0.001</td>
</tr>
<tr>
<td>ICU length of stay: 5.9 vs 7.6 days, NS</td>
<td>SBP &lt; 80 mmHg: 56% vs 56%, NS</td>
</tr>
</tbody>
</table>

Riker RR, Shehabi Y, Bokesch PM, et al. JAMA 2009;301(5):489-499
Landmark Trials: Dexmedetomidine

- **SPICE III (N=3918)**
  - RC, open-label trial of adult ICU patients w/ MV < 12 hrs
  - DEX vs usual care to target RASS goal +1 to -2

<table>
<thead>
<tr>
<th>Efficacy Outcomes</th>
<th>Safety Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death from any cause 29.1% vs 29.1%, NS</td>
<td>Bradycardia: 5.1% vs 0.5%, p&lt;0.0001</td>
</tr>
<tr>
<td>Coma or delirium-free days: 24 vs 23, NS</td>
<td>Hypotension: 2.7% vs 0.5%, p&lt;0.001</td>
</tr>
<tr>
<td>Ventilator-free days: 23 vs 22, NS</td>
<td>Sinus pause: 0.7% vs 0.1%, p=0.003</td>
</tr>
<tr>
<td></td>
<td>Uncontrolled agitation: 2.3% vs 3.9%, p=0.003</td>
</tr>
</tbody>
</table>
# Propofol

## Mechanism of Action
- GABA<sub>A</sub> agonist
- NMDA antagonist
- Activity at nicotinic muscarinic receptors

## Pharmacokinetics
- Onset: 1-2 mins
- Duration:
  - Single dose: 3-10 mins
  - Continuous: Up to 50 hrs

## Dose
- 5-80 mcg/kg/min
- Recommendation: 5-50 mcg/kg/min

## Efficacy
- ↓ Mechanical ventilation
- ↓ Time to extubation
- ? Mortality

## Adverse Effects
- Hypotension and bradycardia
- Hypertriglyceridemia
- Propofol-related infusion syndrome (PRIS)
- Green urine

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Landmark Trials: Propofol

° PRODEX/MIDEX (N=498/500)
  • Two parallel, multicenter, randomized controlled trials of MV patients requiring light to moderate sedation (RASS 0 to -3)

<table>
<thead>
<tr>
<th></th>
<th>Efficacy Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of MV (hrs)</td>
<td>PRODEX: 97 (45-257) vs 118 (48-327), NS</td>
</tr>
<tr>
<td></td>
<td>MIDEX: 123 (67-337) vs 164 (92-380), p=0.03</td>
</tr>
<tr>
<td>Time to extubation (hrs)</td>
<td>PRODEX: 69 (39-184) vs 93 (45-286), p=0.04</td>
</tr>
<tr>
<td></td>
<td>MIDEX: 101 (65-313) vs 147 (81-325), p=0.01</td>
</tr>
</tbody>
</table>
**Landmark Trials: Propofol**

- **PRODEX/MIDEX (N=498/500)**
  - Two parallel, multicenter, randomized controlled trials of MV patients requiring light to moderate sedation (RASS 0 to -3)

<table>
<thead>
<tr>
<th>Safety Outcomes</th>
<th>PRODEX: 13% vs 13.4%, NS</th>
<th>MIDEX: 20.6% vs 11.6%, p=0.007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>PRODEX: 13% vs 10%, NS</td>
<td>MIDEX: 14.2% vs 5.2%, p&lt;0.001</td>
</tr>
<tr>
<td>Bradycardia</td>
<td>PRODEX: 3.7% vs 0.8%, p=0.036</td>
<td>MIDEX: 1.2% vs 1.2%, NS</td>
</tr>
<tr>
<td>1st Degree AV Block</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Landmark Trials: Propofol

Lonardo et al (N=6608)

- Retrospective, cohort of patients MV ≥ 48 hours
- Single, continuous infusion propofol, midazolam, or lorazepam within 7 days of intubation

<table>
<thead>
<tr>
<th>Efficacy Outcomes</th>
<th>Safety Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospital mortality</td>
<td>VAP</td>
</tr>
<tr>
<td>MDZ: RR 0.76 (0.69-0.82)</td>
<td>-MDZ: 6.8% vs 6.2%, NS</td>
</tr>
<tr>
<td>LZP: RR 0.78 (0.68-0.89)</td>
<td>-LZP: 7.9% vs 12.7% (p &lt;0.001)</td>
</tr>
<tr>
<td>Ventilator removal at 28 days</td>
<td></td>
</tr>
<tr>
<td>MDZ: 84.4% vs 75.1% (p &lt;0.001)</td>
<td></td>
</tr>
<tr>
<td>LZP: 84.3% vs 78.8% (p &lt;0.001)</td>
<td></td>
</tr>
</tbody>
</table>
What is best practice for sedation?

**Analgesia-first sedation**
- + Multimodal Pain control

**Analgesia-based sedation**
- + Multimodal Pain control

**Non-benzodiazepine sedative**

- Dexmedetomidine?
- Propofol?
**Landmark Trials: DEX vs. Propofol**

**MENDS2 (N=422)**
- DB, RCT of medical/surgical ICU adults receiving MV for <96 hours and who had suspected or known infection
- DEX 0.2-1.5 mcg/kg/hr vs propofol 5-50 mcg/kg/min

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Dexmedetomidine</th>
<th>Propofol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days alive without delirium or coma at 14*</td>
<td>10.7 (8.5-12.5)</td>
<td>10.8 (8.7-12.6)</td>
</tr>
<tr>
<td>Ventilator-free days at 28*</td>
<td>23.7 (2.5-25.4)</td>
<td>24 (20.9-25.4)</td>
</tr>
<tr>
<td>Death at 90 days, n (%)</td>
<td>81 (38%)</td>
<td>82 (39%)</td>
</tr>
<tr>
<td>TICS-T score at 6 months*</td>
<td>40.9 (33.6-47.1)</td>
<td>41.4 (34-47.3)</td>
</tr>
</tbody>
</table>

*median (95% CI)
## Landmark Trials: DEX vs. Propofol

### MENDS2 (N=422)

<table>
<thead>
<tr>
<th>Event</th>
<th>Dexmedetomidine</th>
<th>Propofol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypotension</td>
<td>119 (56%)</td>
<td>115 (55%)</td>
</tr>
<tr>
<td>Bradycardia (HR &lt;60 bpm)</td>
<td>65 (30%)</td>
<td>39 (19%)</td>
</tr>
<tr>
<td>Self – extubation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever</td>
<td>13 (6%)</td>
<td>5 (2%)</td>
</tr>
<tr>
<td>Required re-intubation</td>
<td>5 (39%)</td>
<td>1 (20%)</td>
</tr>
<tr>
<td>ARDS</td>
<td>111 (52%)</td>
<td>135 (65%)</td>
</tr>
<tr>
<td>Trial drug withdrawal symptoms</td>
<td>22 (10%)</td>
<td>36 (17%)</td>
</tr>
<tr>
<td>Triglycerides &gt;500 mg/dL day 7</td>
<td>3/159 (2%)</td>
<td>6/164 (3.6%)</td>
</tr>
<tr>
<td>Triglycerides &gt;500 mg/dL day 14</td>
<td>1/71 (1.4%)</td>
<td>6/96 (6%)</td>
</tr>
</tbody>
</table>

*N (%)
Benzodiazepines

Midazolam

Onset: 2-5 mins

Duration: 30-80 minutes (prolonged with continuous infusion)

T1/2: 3-11 hrs

Metabolism: CYP3A4 to active metabolite

Adverse Effects: sedation, delirium, dependence

Lorazepam

Onset: 15-20 min

Duration: 6-8 hours

T1/2: 8-15 hours

Metabolism: glucuronidation (no active metabolite)

Adverse Effects: propylene glycol toxicity (<1%)
When are benzodiazepines appropriate?

- Indication for continuous infusion benzodiazepines
  - Neuromuscular blockade
  - Status epilepticus

- Adjunct benzodiazepines
  - Alcohol withdrawal
  - Ventilator dysynchrony despite maximal first line therapy
  - Ongoing agitation despite maximal first line therapy

What is best practice for sedation?

**Analgosedation**
CPOT ≤2 and RASS +1 to -2

Dexmedetomidine or Propofol

Midazolam or Ketamine
What should you do with sedation once you start it?

Analgesia/Sedation
Spontaneous Awakening Trial

Both SATs and SBTs

Spontaneous Breathing Trial

Patient

A

C
Awakening and Breathing Controlled trial

Exclusion from SAT:
- Active seizures
- ETOH withdrawal
- Escalating sedative doses due to ongoing agitation
- Neuromuscular blocker
- Active MI in previous 24 hours
- Increased ICP

## ABC trial

<table>
<thead>
<tr>
<th></th>
<th>SAT/SBT (N=167)</th>
<th>Control (N=168)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventilator-free days (28 days)</td>
<td>14.7 (0.9)</td>
<td>11.6 (0.9)</td>
<td>0.02</td>
</tr>
<tr>
<td>Time to discharge from ICU</td>
<td>9.1 (5.1-17.8)</td>
<td>12.9 (6-24)</td>
<td>0.01</td>
</tr>
<tr>
<td>Time to hospital discharge</td>
<td>14.9 (8.9-26.8)</td>
<td>19.2 (10.3 to NA)</td>
<td>0.04</td>
</tr>
<tr>
<td>28-day mortality</td>
<td>47 (28%)</td>
<td>58 (35%)</td>
<td>0.21</td>
</tr>
<tr>
<td>1-year mortality</td>
<td>74 (44%)</td>
<td>97 (58%)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

ABC: Sedation Outcomes

<table>
<thead>
<tr>
<th></th>
<th>SAT/ SBT (N=167)</th>
<th>Control (N=168)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benzodiazepine use</td>
<td>120 (72%)</td>
<td>111 (66%)</td>
<td>0.25</td>
</tr>
<tr>
<td>Benzodiazepine total dose (mg)</td>
<td>20 (5-93)</td>
<td>39 (8-213)</td>
<td>0.02</td>
</tr>
<tr>
<td>RASS on first study day</td>
<td>-4 (-5 to -2)</td>
<td>-4 (-5 to -2)</td>
<td>NS</td>
</tr>
<tr>
<td>RASS at first successful SBT</td>
<td>-1 (-3 to 0)</td>
<td>-2.5 (-4 to 0)</td>
<td>0.0001</td>
</tr>
<tr>
<td>Duration of Coma</td>
<td>2 (0 to 4)</td>
<td>3 (1 to 7)</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Sleap

- Protocolized sedation plus daily interruption or protocolized sedation alone (N=423)

- Sedation target: Sedation Agitation Scale (SAS) 3 to 4 (RASS 0 to -3)

- Continuous infusion fentanyl and midazolam

### What is best practice for SATs?

<table>
<thead>
<tr>
<th>Control group targeted sedation</th>
<th>ABC: Patient specific</th>
<th>SLEAP: Light sedation (RASS 0 to -3 or SAS 3 to 4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedation level</td>
<td>RASS -4</td>
<td>SAS 3 (similar to RASS -1 or -2)</td>
</tr>
<tr>
<td>Sedation Management</td>
<td>Physicians and researchers</td>
<td>Bedside nurse</td>
</tr>
<tr>
<td>Benzodiazepine exposure</td>
<td>↓ SAT group</td>
<td>↑ SAT group</td>
</tr>
<tr>
<td>Outcome</td>
<td>Positive for SAT</td>
<td>No difference</td>
</tr>
</tbody>
</table>

What is best practice for sedation?

Analgesedation
CPOT ≤2 and RASS +1 to -2

Dexmedetomidine or Propofol

Midazolam or Ketamine

Nurse driven protocol targeting light sedation and SATs
Delirium Assessment, Prevention, and Management
Delirium

- 50-80% of ICU patients
- Positive delirium screening associated with cognitive impairment at 3 and 12 months after ICU discharge
  - May be associated with longer hospital stay
- Missed 75% of the time if not monitored
Delirium Assessment

- **Good Practice Statement:** Critically ill adults should be regularly assessed for delirium using a valid tool.
Risk Factors for Delirium

- Modifiable
  - Benzodiazepine use
  - Blood transfusions

- Non-Modifiable
  - Age
  - Dementia
  - Prior coma
  - Emergency surgery or trauma
  - Severity of illness
## Delirium Management

<table>
<thead>
<tr>
<th>PREVENTION</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Haloperidol</td>
<td>✗</td>
</tr>
<tr>
<td>Atypical antipsychotic</td>
<td>✗</td>
</tr>
<tr>
<td>Dexmedetomidine</td>
<td>✗</td>
</tr>
<tr>
<td>Statin</td>
<td>✗</td>
</tr>
<tr>
<td>Non-pharmacologic single-component therapy</td>
<td>✗</td>
</tr>
<tr>
<td>Non-pharmacologic multi-component therapy</td>
<td>✓</td>
</tr>
</tbody>
</table>
## Delirium Management

### TREATMENT

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haloperidol</td>
<td><strong>X</strong></td>
</tr>
<tr>
<td>Atypical antipsychotic</td>
<td><strong>X</strong></td>
</tr>
<tr>
<td>Dexmedetomidine</td>
<td><strong>✓</strong></td>
</tr>
<tr>
<td>Statin</td>
<td><strong>X</strong></td>
</tr>
<tr>
<td>Non-pharmacologic single-component therapy</td>
<td><strong>X</strong></td>
</tr>
<tr>
<td>Non-pharmacologic multi-component therapy</td>
<td><strong>✓</strong></td>
</tr>
</tbody>
</table>

---

Early Mobility and Exercise
Oh the places we’ll go…

THEN

NOW

https://www.sciencephoto.com/media/626568/view/patient-prepared-for-surgery
https://www.icudelirium.org/medical-professionals/early-mobility-and-exercise
Early Mobility and Exercise

° Getting patients off sedation and out of bed
° Pair daily SAT with physical & occupational therapy
° Outcomes
  • ↑ muscle strength at ICU discharge
  • ↓ duration of mechanical ventilation
  • ↓ delirium

Family Engagement

Patient

A
B
C
D
E
Other things may change us, but we start and end with the family.

-Anthony Brandt
Family Engagement

- Incorporation of family’s wishes, concerns, and plans
- Increased communication with family
- Family presence on rounds
- Family education about delirium and PICS
What are the ABCs to optimize outcomes in critically ill patients?
Assess, prevent and manage pain

Both SAT and SBT

Choice of analgesia and sedation

Delirium: Assess, prevent and manage

Early mobility and exercise

Family engagement
“Ultimately, a culture of ICU liberation is endorsed by all members of the interprofessional ICU team including the nurse, respiratory therapist, **pharmacist**, physical and occupational therapists, social worker, chaplain, nurse practitioner or physician assistant, and physician.”

-E. Wesley Ely, MD, MPH, FCCM
Questions?