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# *Early Mobility: The Experiences of Two ICUs*

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- **Nothing to disclose**

# *Objectives*

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- **At the end of the presentation the learner will be able to:**
  - Describe the process of developing an early mobility protocol for ICU patients and how to modify to adapt to specific patient populations
  - Define the impact a mobility protocol can have on:
    - ICU LOS
    - Hospital LOS
    - Deposition

## *Historical Background...*

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- **Early ambulation first introduced in WW II**
  - Expedited recovery for soldiers to return to war
    - Rheums Dis Clinic NA 1990;16:791-801
- **“Early Rising After Operation”**
  - NEJM 1942; 14:576-577
  - Benefits of early mobility were clear
    - “First, morale is greatly improved...General health and strength are better maintained & convalescence is more rapid”

# *Risks associated with immobility....*

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- Complications can be significant for bedridden, critically ill patients
- Multiple random trials have associated bed rest with HARM
  - Neuromuscular dysfunction – Stevens RD, et. Al., *Intensive Care Medicine*, 2007, Angela KM, et. Al., *ICU Director*, 2012
  - Delayed weaning from mechanical ventilation - Morris PE., *Crit Care Clin*, 2007
  - Neuropsychiatric, cognitive dysfunction - Pisani MA *et al.*, *AJRCCM*, 2010

# *Is mobility important for ICU patients?*

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- **Evidence suggests yes!**
  - Decreased LOS in ICU
  - Decreased days on ventilator
  - Decreased pressure ulcer rates
  - Improved mortality

# *Protocols/Guidelines can help improve getting patients moving*

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- **“The greatest impact of early mobilization is through standardized mobility protocols or programs”.**

**Pashikanti, L and Von Ah, Diane, 2012**

# *Do we actively mobilize our patients?*

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- **MTQIP survey results**
  - 80% admit their patients to the ICU with a bedrest order
  - 70% mobilize (bedside PT, OOB to chair, standing and/or walking) patients only after they are hemodynamically stable
  - Reasons to withhold mobility included: FIO<sub>2</sub> >60%, *Ventricles*, Epidurals, sedation, *unclear spines*.
- **So the answer is mostly no. But would a mobility protocol really make a difference?**



# *How Did we build the Protocol?*

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**Dickinson S, Tschannan D and Shever L, Can the Use of an Early Mobility Program Reduce the Incidence of Pressure Ulcers in a Surgical Critical Care Unit? Critical Care Nurse Quarterly Jan-Mar 2013.**

## **How Did We Do This??**

- No definitive literature to guide our protocol
- Utilized Evidence from:
  - Rehabilitation Medicine
  - Immunology
  - Gerontology
  - Biological Sciences/Medical Sciences
  - Physiotherapy Research

# *Literature Review*

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- ★ **Title: Early Intensive Care Unit Mobility Therapy in the Treatment of Acute Respiratory Failure**
- ★ **Purpose:** To assess the frequency of physical therapy, site of initiation of physical therapy, and patient outcomes comparing respiratory failure patients who received usual care compared with patients who received physical therapy from a Mobility Team using the mobility protocol.
- ★ **Method:** Prospective cohort study of MICU patients with acute respiratory failure requiring mechanical ventilation on admission. An ICU Mobility Team (ICU RN, Nursing Assistant, PT) initiated the protocol within 48 hours of mechanical ventilation.
- ★ **Results: A Mobility Team using a mobility protocol initiated earlier physical therapy was feasible, safe, did not increase costs, and was associated with decreased ICU and hospital LOS in survivors who received physical therapy during ICU treatment versus patients who received usual care.**

# *Literature review...*

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- ★ **Title: Early Physical and Occupational Therapy in Mechanically Ventilated, Critically Ill Patients: A Randomized Controlled Trial**
- ★ **Purpose:** To assess the efficacy of combining daily interruption of sedation with physical and occupational therapy on functional outcomes in patients receiving mechanical ventilation in intensive care.
- ★ **Method:** Prospective, randomized controlled trial of sedated adults. Patients were randomized to early exercise and mobilization (PT and OT) during periods of sedation interruption or to therapy as ordered per primary team during sedation holiday.
- ★ **Results:** Return to independent functional status at hospital discharge occurred in significantly more patients from the intervention group versus control. Intervention group also had significantly shorter duration of delirium and more ventilator-free days during 28-day follow-up than controls. **Interruption of sedation combined with PT and OT in the earliest days of critical illness was safe and well tolerated.**

# *Barriers to Overcome*

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- **“Bed rest” as an admission order selection**
- **Concern for the safety of tubes and lines**
- **Patient size**
- **Hemodynamic/respiratory instability**
- **Sedation protocols**
- **Limited resources (people and equipment)**
- **Fear by all**



## Early Mobility Program “Moving and Grooving”

Phase 0	Phase 1	Phase 2
Range of Motion Passive (3x/day, 10 repetitions) Active (3x/day, 10 repetitions)	Range of Motion Passive (3x/day, 10 repetitions) Active (3x/day, 10 repetitions)	Range of Motion Resistance (3x/day, 10 repetitions)
HOB Elevated 30-45 degrees Or Reverse Trendelenberg	HOB Elevated 30-45 degrees Or Reverse Trendelenberg	HOB Elevated 30-45 degrees
		Reposition (every 2 hours)
Reposition (every 2 hours)	Reposition (every 2 hours)	Standing (3x/day)
Continuous Lateral Rotation (18-24 hours per day)	Chair position or OOB with sling (3x/day)	OOB (bear own weight) (3x/ day)
If patient tolerates these activities, advance to next phase	Dangling (3x/day)	Walking (3x/day)

Early Mobility Program Initiated in the Surgical ICU 2010  
 Adopted and started in the Trauma Burn ICU April 2012



### Inclusion Criteria:

- **Early activity is initiated when the patient achieves physiological stabilization**
- **Low dose catecholamine drips should not preclude the patient from early mobility (i.e. low dose norepi, phenylephrine, vasopressin)**
- **FiO<sub>2</sub> < or equal to 80% (Used to be 60%)**
- **Peep less than or equal to 10 cm H<sub>2</sub>O**

### Goals:

- 1. Every patient should be evaluated for early mobility.**
- 2. Small efforts can yield large results.**
- 3. Never give up! Poor tolerance during one episode does not predict future tolerance.**
- 4. Evaluate patient readiness and response to current therapy and ability to progress.**

**\*Possible criteria to withhold early mobility: hypoxia, hemodynamic instability (escalation of vasopressors in the last 12 hours), ICP monitoring or unstable cardiac rhythm (life threatening rhythm that compromises blood pressure in past 24 hours) or new cardiac arrhythmia & epidural.**



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*HOW DID WE MODIFY FOR  
BURN PATIENTS?*

## Inclusion Criteria:

- Early activity is initiated when the patient achieves physiological stabilization
- Low dose catecholamine drips should not preclude the patient from early mobility (i.e. low dose norepi, phenylephrine, vasopressin)
- FiO<sub>2</sub> < or equal to 60%
- Peep less than or equal to 10 cm H<sub>2</sub>O

## Trauma Burn Special Considerations:

- ROM should only be performed on non-impaired joints or those with stable orthopedic injuries
- See post-op wound sheet for activity restrictions s/p grafting
- Spinal cord injury pts. need abd. binder, Juzos or ACE, and proper chair for mobility
- ACE wraps to lower extremities if burn present

## Goals:

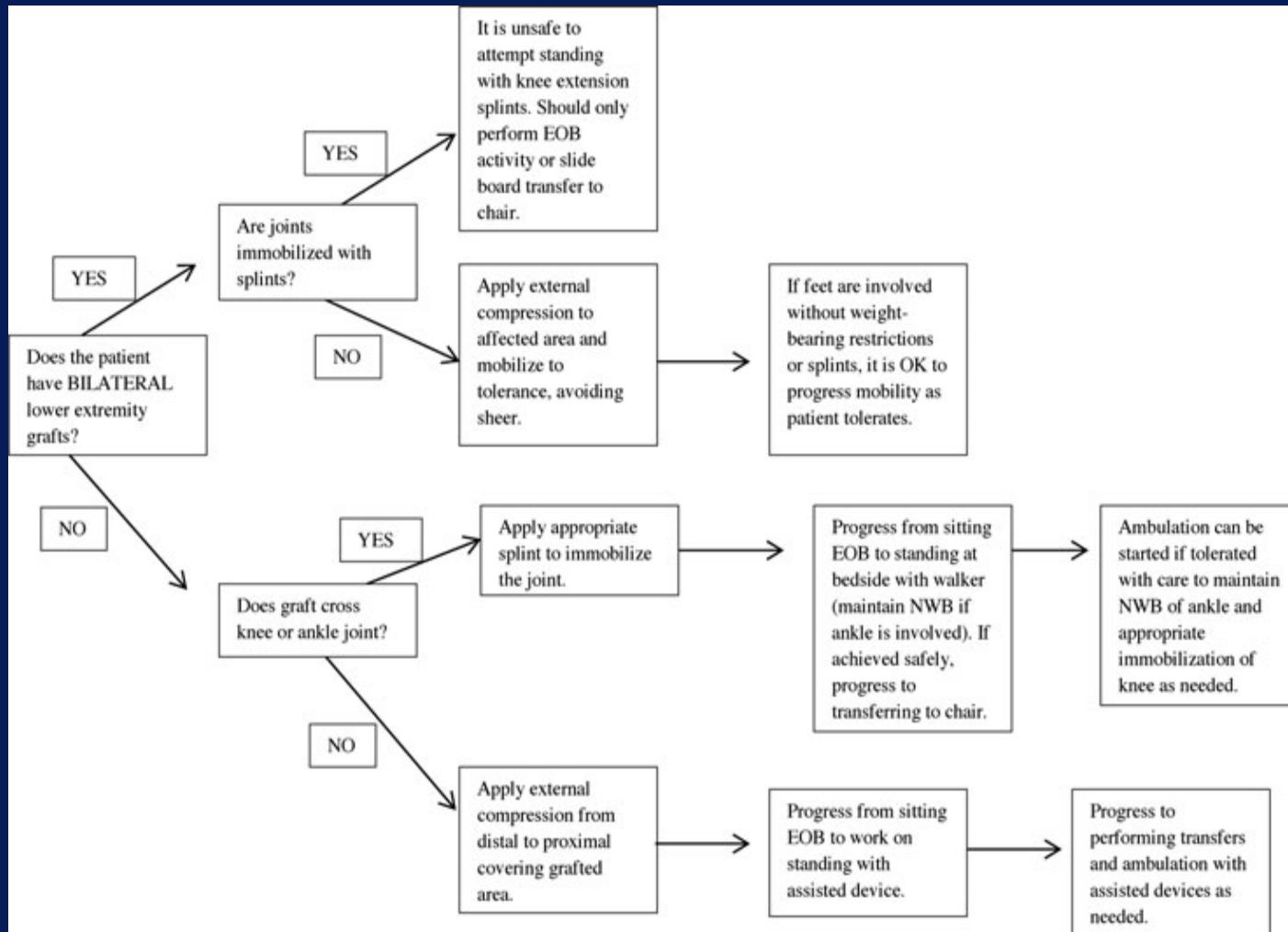
1. Every patient should be evaluated for early mobility.
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**\*Possible criteria to withhold early mobility: hypoxia, hemodynamic instability (escalation of vasopressors in the last 12 hours), ICP monitoring or unstable cardiac rhythm (life threatening rhythm that compromises blood pressure in past 24 hours) or new cardiac arrhythmia, epidural, & critical/difficult airways.**

**\*Special considerations need to be addressed for: spinal clearance, orthopedic injuries and newly placed skin grafts prior to starting ROM.**



# Burn Algorithm s/p Grafting



# Tracking the data...

5806	5810	5814	5818	5820	5824	Reg Num
11/25/2010 1:42	11/11/2010 21:35	11/2/2010 23:19	11/12/2010 19:44	10/28/2010 0:28	11/19/2010 20:15	Room
5	19	28	18	33	11	Admit Date
86%	71%	67%	86%	97%	97%	LOS
Phase 0	Phase 1*	Phase 1	Phase 0	Phase 0	Phase 0	Overall Doc Grade
Phase 0	Phase 2*	Phase 1	Phase 0	Phase 0	Phase 0	Initial Phase
1	2	3	1	5	1	Phase Today
0	2	3	0	7	0	Phase 0 Count
0	0	0	0	3	0	Phase 1 Count
0	2	3	0	7	0	Phase 2 Count
0	1	2	0	7	0	Phase Up Count
2	3	2	3	3	3	Phase Down Count
3	5	4	2	5	3	ROM
11	12	12	11	11	11	HOB
0	0	0	0	0	0	Reposition
0	0	1	0	0	0	Phase 0 Cont LR
0	0	1	1	0	0	Phase 1 Chair pos
0	3	0	0	0	0	Phase 1 Dangling
0	3	0	0	0	0	Phase 2 Standing
0	2	0	0	0	0	Phase 2 COB
0	2	0	0	0	0	Phase 2 Walking



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# *OUTCOMES*

# TBICU: Patients

<b>Pre-Initiation Data Period : December 11, 2011 - April 29, 2012</b>			
<b>Post-Initiation Data Period: April 30, 2012 - August 31, 2012</b>			
	<b>Pre</b>	<b>Post</b>	<b>% Change</b>
<b>Admissions:</b>	<b>180</b>	<b>225</b>	<b>25.0</b>
<b>Case Mix:</b>			
<b>Burn</b>	<b>29</b>	<b>57</b>	<b>96.6</b>
<b>Trauma Post-Op</b>	<b>16</b>	<b>22</b>	<b>37.5</b>
<b>Trauma Non-Op</b>	<b>83</b>	<b>95</b>	<b>14.5</b>
<b>All Other</b>	<b>52</b>	<b>51</b>	<b>-1.9</b>

# TBICU: LOS

	Pre	Post	% Change
<b>ICU Length of Stay</b>			
<b>Average</b>	<b>5.76</b>	<b>4.23</b>	<b>-26.6</b>
<b>Median</b>	<b>2.28</b>	<b>1.80</b>	<b>-21.0</b>
<b>Minimum</b>	<b>0.09</b>	<b>0.03</b>	<b>-63.6</b>
<b>Maximum</b>	<b>84.03</b>	<b>32.61</b>	<b>-61.2</b>
<b>Hosp Length of Stay</b>			
<b>Average</b>	<b>13.40</b>	<b>10.47</b>	<b>-21.9</b>
<b>Median</b>	<b>6.82</b>	<b>6.87</b>	<b>0.7</b>
<b>Minimum</b>	<b>0.23</b>	<b>0.17</b>	<b>-22.8</b>
<b>Maximum</b>	<b>196.62</b>	<b>60.00</b>	<b>-69.5</b>

Acuity down 11.1% in Post-Implementation period. This led to an expected decrease in ICU and hospital length of stay (LOS) as well as decreased ICU and hospital mortality rates. Case mix shows a significant increase in Burn and Post-Op trauma admissions in the Post-Implementation period.

# Mortality

	Pre	Post	% Change
<b>ICU Disposition Status</b>			
<b>Live</b>	<b>170</b>	<b>216</b>	<b>27.1</b>
<b>Dead</b>	<b>10</b>	<b>9</b>	<b>-10.0</b>
<b>Mortality Rate</b>	<b>5.56</b>	<b>4.00</b>	<b>-28.1</b>
<b>Hosp Disposition Status</b>			
<b>Live</b>	<b>160</b>	<b>192</b>	<b>20.0</b>
<b>Dead</b>	<b>12</b>	<b>11</b>	<b>-8.3</b>
<b>Mortality Rate</b>	<b>6.98</b>	<b>5.42</b>	<b>-22.3</b>

More patients were leaving the unit and hospital alive!



# SICU outcomes - When combined with our CCI Bundle....

Datapoint	Pre-Implementation Avg (Total)	Post-Implementation Avg (Total)	% Change
Patient CCI Encounters	32	42	31.3%
SICU-Only Readmissions	10	6	-40.0%
Age	53.5	53.7	0.4%
Day 1 APACHE	74.5	68.8	-7.7%
ICU LOS	35.1	24.4	-30.3%
<b>Hosp LOS</b>	<b>55.9</b>	<b>40.9</b>	<b>-26.8%</b>
<b>Vent LOS</b>	<b>27.8</b>	<b>15.5</b>	<b>-44.2%</b>
<b>Total Group Vent Days</b>	<b>(835)</b>	<b>(622)</b>	<b>-25.5%</b>
<b>CRRT Days</b>	<b>21.9</b>	<b>14.9</b>	<b>-32.0%</b>
Total Group CRRT Days	(351)	(224)	-36.2%

<u>ICU Disposition</u>	<u>Pre-Implementation</u>	<u>Post-Implementation</u>	<u>% Change</u>
Alive	22	35	59.1%
Dead	10	7	-30.0%
Rate	31.3%	16.7%	-46.6%

Hosp Disposition	Pre-Implementation	Post-Implementation	% Change
Alive	17	32	88.2%
Dead	11	9	-18.2%
Rate	39.3%	22.0%	-44.0%



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# *THE CHALLENGE OF THE “DIFFICULT” ICU PATIENT*

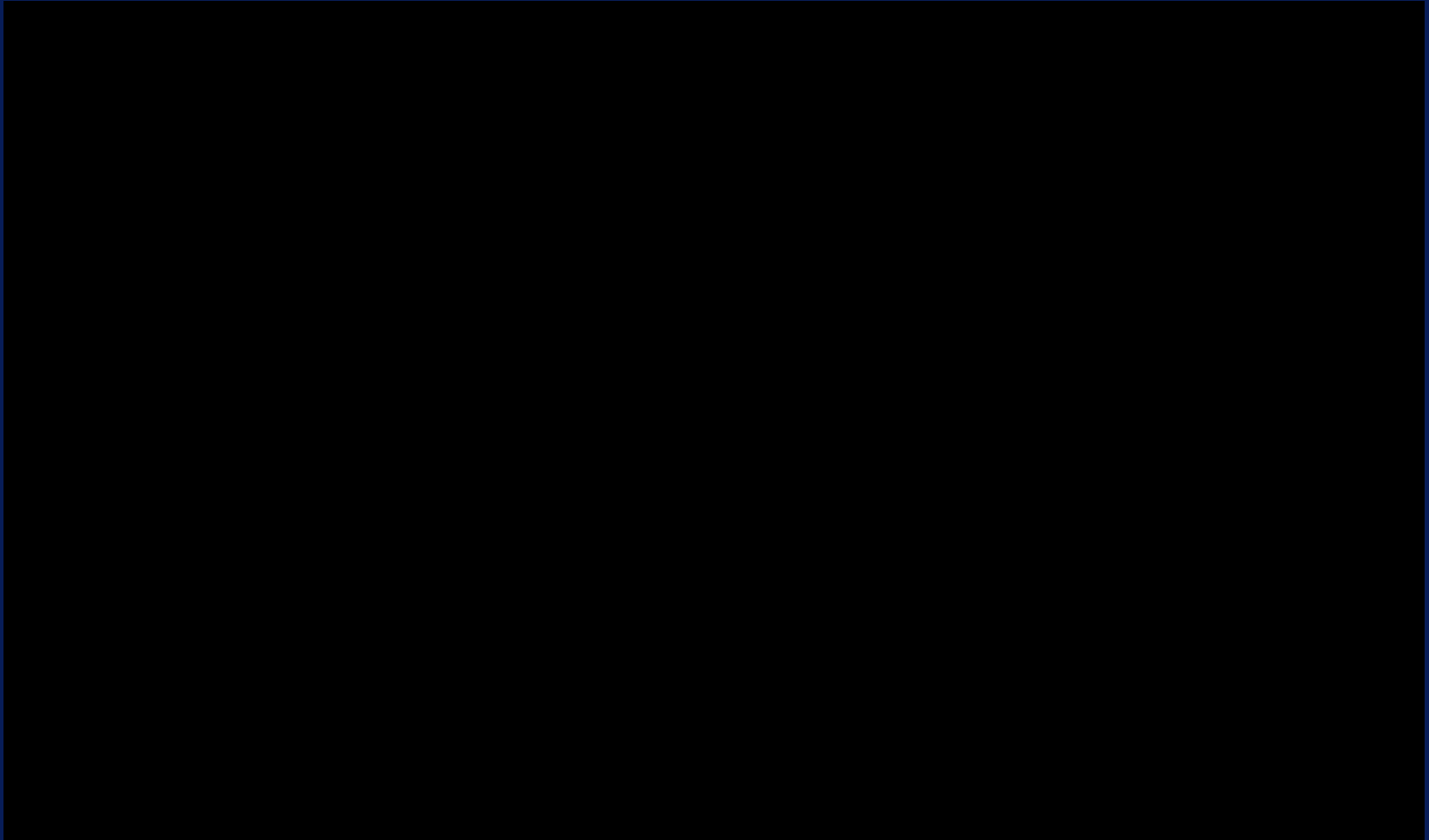


# *CRRT/ECMO Patient Being Mobilized.....*



# *70% TBSA Burn Patient*

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## *Conclusions.....*

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- **It is easy and safe to mobilize patients**
- **Standardized protocols help to define expectations and will enhance mobility**
- **Even the most complicated ICU patients can get up and moving with standardized protocols (burns, trauma, ventilated, CRRT, ECMO, other)**
- **Standardized mobility protocols can improve outcomes: ICU, LOS, Vent days, CRRT days, Disposition, and other areas not discussed (i.e. pressure ulcer free days and patient well being)**

# *Questions?*

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