EARLY MOBILIZATION IN THE ICU

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About NYU Langone Hospital (Tisch)

• Academic Medical Center
• 705-Bed Acute-Care Tertiary Facility
• 18 Medical ICU Beds
• 9 Surgical ICU Beds
• Magnet® Recognized (3 times consecutively)
• Rusk Rehabilitation ranked #8 in *US News and World Report* (#1 in New York State)
Objectives

• Define the ABCDEF Bundle and how it was implemented and NYULHC
• Describe how to initiate an early mobilization program
• Share the results of effective early mobilization programs in the adult and pediatric ICUs at NYULHC
• Review strategies for sustainability of a program
• Discuss challenges and successes with implementing an early mobility program
What is Early Mobilization?

• The proactive provision of physical therapy to critically ill patients on ICUs. Includes:
  – sitting on edge of the bed
  – sitting on chair
  – Ambulating
    (Fraser, Spiva, Forman, & Hallen, 2015)

• “Early” defined as “the interval starting with initial physiologic stabilization and continuing through the ICU stay” (Fraser, Spiva, Forman, & Hallen, 2015)

• In practice, early mobility programs can be difficult to implement given the complexity of safely mobilizing a patient while still on a ventilator. (Klompas, 2015)
Early Mobilization and Ventilator Associated Events

- Immobility is associated with atelectasis and pneumonia
- Early physical and/or occupational therapy
  - Can decrease time on the ventilator
  - Reduce risk of acute delirium
  - Has been associated with lower rates of complications and Ventilator Associated Pneumonia
    
    (Cocoros & Klompas, 2016)
# The “ABCDEF(+G)” Bundle

<table>
<thead>
<tr>
<th>A</th>
<th>Awakening</th>
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<tbody>
<tr>
<td></td>
<td>Assess “RASS” score</td>
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<tr>
<td></td>
<td>Spontaneous Awakening Trial</td>
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<td>Sedation Vacation</td>
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<thead>
<tr>
<th>B</th>
<th>Breathing</th>
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<tbody>
<tr>
<td></td>
<td>Spontaneous Breathing Trial</td>
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<tr>
<td></td>
<td>Ventilator Weaning Rounds</td>
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<thead>
<tr>
<th>C</th>
<th>Coordination</th>
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<tbody>
<tr>
<td></td>
<td>Inter-disciplinary team rounding</td>
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<tr>
<td></td>
<td>Weaning / Extubation Protocol review</td>
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<tr>
<td></td>
<td>ICU Checklist utilized with AM and PM rounds</td>
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<thead>
<tr>
<th>D</th>
<th>Delirium</th>
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<tbody>
<tr>
<td></td>
<td>Delirium screening with CAM-ICU tool</td>
</tr>
<tr>
<td></td>
<td>Nonpharmacological interventions promoted</td>
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<td></td>
<td>“Quiet Time” established</td>
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<table>
<thead>
<tr>
<th>E</th>
<th>Early Mobilization</th>
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<tbody>
<tr>
<td></td>
<td>PT, OT, RN, &amp; RT collaborate to patient exercise and ambulation</td>
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<tr>
<td></td>
<td>SLP review speech &amp; swallow abilities</td>
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<table>
<thead>
<tr>
<th>F</th>
<th>Family</th>
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<tbody>
<tr>
<td></td>
<td>Family engagement promoted in plan of care</td>
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<tr>
<td></td>
<td>Family meetings held as needed</td>
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<tr>
<td></td>
<td>SW, CM, and Chaplaincy services incorporated in plan of care</td>
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<thead>
<tr>
<th>G</th>
<th>Goal (new addition)</th>
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<tr>
<td></td>
<td>Goals of care discussed with daily rounds</td>
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<tr>
<td></td>
<td>Short-term and long-term goals discussed</td>
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<tr>
<td></td>
<td>Patient progression and barriers reviewed</td>
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</tbody>
</table>
ICU Checklist

- Helps to ensure standard ICU needs are addressed for each patient
- Designed to promote discussion on different matters of care
- Utilized with morning and evening rounds

Interdisciplinary ICU Checklist

Interdisciplinary team members present

Code Status Documented and Current?
Is Health Care Proxy or surrogate form complete?
Review current and expiring medications
If central line present, still needed?
If arterial line present, still needed?
If urinary catheter present, still needed?
GI Prophylaxis needed?
VTE Prophylaxis needed?
Early Mobility Candidate?
Review sedation/analgesia
Addressed glycemic control
Has nutrition been reviewed, including goals?
Review consults
Current level of care appropriate?

Interdisciplinary ICU Checklist (Evening rounds)

Interdisciplinary team members present

Central lines removed as planned
Potential sedation holiday for awakening in the AM?
Potential extubation in AM?
AM chest x-ray needed?
Only necessary AM labs ordered
Safe Patient Handling

- Each room in MICU & SICU equipped with ceiling lift devices
- Utilized to assist patients with repositioning, transferring between chair/bed, and mobilization
- Used by RN, PT/OT
Starting an Early Mobilization Program

• Leadership support
• Business plan
• Forming a team
Key Driver Diagram

SMART Aim

We will increase percent of PICU patients who are mobilized within recommended* time frame from 60% to 80% by June 2016.

*Recommended time frame: 18 hours from PICU admission for non-ventilated patients, 48 hours from PICU admission for vented patients

Population: PICU patients 18 months and older

Global Aim

Improve patient experience and outcomes, generate cost savings

Key Drivers

- Consistent identification of patients ready to be mobilized and formulation of mobilization plan
- Accurate and timely orders for patients who need to be mobilized
- Consistent use of evidence based weaning and sedation protocols
- Adequate resources available to safely and consistently mobilize patients
- Staff comfortable to safely mobilize patients
- Parent/Family/Patient comfortable mobility process
- Staff understanding benefits of early mobilization

Interventions

- Create, test, implement use of an algorithm to identify patients eligible for mobilization
- Train staff in use of algorithm
- Update order sets
- Make LIPs aware of change (via e-mail)
- Review and update weaning, sedation/choice of medication protocols based on current evidence. Ensure consistent use of updated protocol by LIPs, Nurses and RT
- Assess current resources (time/space/staff)
- Implement patient schedule to maximize use of staff time
- Create a procedure to ensure that all RNs, PCTs, therapists are trained on how to safely mobilize critically ill patients
- Incorporate patient/family concerns re: mobilization in the ICU during rounds and treatment
- Work with FAC and YAC to identify patient/family barriers to mobilization
- Involve CAT, CL, IH for mobilization and prep
- Change culture of early mobility for all team members

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Interventions Summary

- Increased staffing and intensity of service based on business proposal (Adult)
- Interdisciplinary team mobilized (Adult and Peds)
- PICU admission order set updated (Adult and Peds)
- Algorithm created (Peds)
- Patient scheduling (Adult and Peds)
- Therapy/Nursing education and training provided (Adult and Peds)
- Family advisor interviews conducted with patients and caregivers (Peds)
- Family advisor/nursing discussions conducted (Peds)
# Early Mobilization: Contraindications, Precautions, and Signs of Intolerance

## Contraindications
- Elevated Intracranial pressure: > 15mmHg (or otherwise specified by medical team)
- Uncontrolled seizures
- Acute change in mental status
- Positive end expiratory pressure (PEEP) ≥ 10
- Fraction of inspired oxygen (FiO\textsubscript{2}) ≥ 0.60
- Richmond Agitation Scale (RASS) ≤ -3, ≥ +4
- Hemodynamic instability (significant/multiple pressure support agents, anything uncontrolled)
- Open chest/abdomen
- Unstable fractures
- Uncontrolled active bleeding

## Precautions
- Difficult/insecure airway
- Richmond Agitation Scale -2, +2, +3
- Continuous dialysis
- Vasopressor medication
- Lumbar drain/External ventricular drain (need to re-calibrate with movement)
- Severe Osteopenia

## Signs of Intolerance
- Oxygen saturation below established range by medical team
- Increased work of breathing, i.e. accessory muscle use, cyanosis, diaphoresis, breath holding, nasal flaring, etc.
- Change in vitals deemed to be excessive as defined by the medical team
- Negative change/alteration in cognition, increased agitation, etc.
EARLY REHABILITATION IN THE ICU: A PERFORMANCE IMPROVEMENT PROJECT

**Pre Group** – consists of 123 Tisch ICU inpatient discharges between Jan to May 2012

**Pilot Group** – consists of 160 similar Tisch ICU discharges between March to June 2014

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**AVERAGE LENGTH OF STAY (ALOS) COMPARISON**

- ICU Bed ALOS ↓ 0.9 days 20%
- Floor Bed ALOS ↓ 1.9 days 30% when compared to pre group

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**AVERAGE DIRECT COST PER DAY PER BED TYPE COMPARISON**

Direct costs per ICU bed ↓ 9.1% and floor beds ↓ direct costs by 3.2% when compared to pre group

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**ESTIMATED ANNUALIZATION OF COST SAVINGS**

Using projected total # of patients per year of 541 and average cost per day data, the estimated annualized cost savings is $2.2M or 29% when Pilot is compared to Pre Group.

(Note: Savings does not include additional Therapy labor costs of $809k annually)

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**ACADEMIC OUTCOMES**

A abstract entitled Early Rehabilitation in the Medical and Surgical Intensive Care Units: A Performance Improvement Project has been accepted as BOTH a poster and an oral presentation for the 3rd Annual Johns Hopkins Critical Care Rehabilitation Conference on October 24 – 25, 2014.

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**CLINICAL OUTCOMES**

- Discharge home with or without services ↑ from 59.5% in 2012 to 75.9% in 2014
- Discharge home without services ↑ and improved from 18% to 40%
- Discharge to Acute Rehab ↓ from 24% in 2012 to 13% in 2014
- Discharge to Sub-Acute ↓ from 6% in 2012 to 1% in 2014
- Discharges to Nursing Home ↓ from 10% in 2012 to 6% in 2014

Intensity of PT, OT and Speech therapy services ↑ by an average of 60 minutes per day per patient from 2012 to 2014
PICU Patients Mobilized Within Established Time Frame

- PICU Admission Order Set Updated to include activity orders 11/19/15
- Scheduling of patients for therapies initiated 4/11/16
- Family advisor discussions with families initiated 6/2/16
- Mobilization training initiated for nursing staff 6/6/16
- Algorithm Finalized 2/25/16
- Initiated late shift for PT/OT 3 days a week to increase POD#0 coverage 11/1/16

% of Patients Mobilized within Established Time Frame

Week Ending Date

- % of Patients Who Met the Desired Clinical Outcome
- Median
- Goal

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Time From PICU Admission to First Mobilization

Weekly Average (in Hours) vs. Date

- Daily Average Hours
- Centerline
- Control Limits
Outcomes (PICU)

<table>
<thead>
<tr>
<th>Orders</th>
<th>Percent of Patients</th>
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<tbody>
<tr>
<td>Activity</td>
<td>PRE (N=51)</td>
</tr>
<tr>
<td>PT Orders</td>
<td>POST (N=46)</td>
</tr>
<tr>
<td>OT Orders</td>
<td></td>
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<tr>
<td>SLP Orders</td>
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</tr>
</tbody>
</table>

- Activity Orders: 89% PRE, 91% POST
- PT Orders: 82% PRE, 91% POST
- OT Orders: 76% PRE, 91% POST
- SLP Orders: 12% PRE, 52% POST
- % Patients Mobilized within recommended time frame: 85% POST, 60% PRE

Legend: PRE (N=51) | POST (N=46)
Barriers to Mobilizing Non-Vented Patients (PICU)

Types of Barriers

- None: 29% (PRE: 21%, POST: 29%)
- Lack of resources (time, staff): 48% (PRE: 45%, POST: 48%)
- Appropriate equipment not available: 19% (PRE: 14%, POST: 19%)
- Lack of training/education: 13% (PRE: 12%, POST: 13%)
- Patient agitated, confused, delirious: 15% (PRE: 17%, POST: 15%)
- Too much coordination needed: 15% (PRE: 4%, POST: 15%)
- Too many lines/drains: 19% (PRE: 21%, POST: 19%)
- Patient unsteady at basing/waiting PT/OT Evaluation: 15% (PRE: 12%, POST: 15%)
- Patient/family uncomfortable: 21% (PRE: 10%, POST: 21%)
- Other: 10% (PRE: 7%, POST: 10%)
Barriers to Mobilizing Vented Patients (PICU)

Types of Barriers

- None
- Lack of resources (time, staff)
- Appropriate equipment not available
- Lack of training/education
- Patient agitated, confused, delirious
- Too much coordination needed
- Too many lines/drains
- Patient/family uncomfortable
- Other

Percentage of Total Occurrences

- PRE (N=51)
- POST (N=43)
Greatest Concerns About Mobilizing Patients (PICU)

- 44% of responses indicated feeling uncomfortable.
- 32% mentioned not being trained.
- 10% noted having had a bad experience.
- 36% expressed concern about lines or drains coming out.
- 28% were afraid they might not be able to manage the ventilator properly.
- 28% were concerned about self-extubation.
- 12% had other concerns.
- 13% had no specific concerns.

(Pre: N=51, Post: N=43)
Key Components of Sustainability

- Supportive management structure
- Change structure (to prevent “slip back”)
- Robust, transparent feedback system
- Shared sense of the system to be improved
- Culture of improvement
- Engaged staff
- Formal capacity to build programs

(Institute for Healthcare Improvement, n.d.)
# Implementation/Sustain Plan

<table>
<thead>
<tr>
<th>Activity</th>
<th>Status</th>
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<tbody>
<tr>
<td>Identify process owner/create transition plan</td>
<td>PT Supervisor with assistance from project manager.</td>
</tr>
<tr>
<td>Monitor performance/data collection</td>
<td>Currently on paper, collected daily. Long-term goal to transition to using reports from EHR.</td>
</tr>
<tr>
<td>Standards and procedures</td>
<td>Still in process of being hardwired. Education to continue.</td>
</tr>
<tr>
<td>Training</td>
<td>On-going</td>
</tr>
<tr>
<td>Transition Plan</td>
<td>Goal is unit/therapy leadership to integrate early mobility into daily care treatment. Transition near completion.</td>
</tr>
</tbody>
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Challenges

• Coordination of the mobilization team in real-time
• Coordination of training
• Changing culture is gradual
• Time and resources
• Documentation consistency
• Sustainability
Successes/Wins

• Strong team collaboration (including family advisors)
• Positive feedback from patients and families
• Improved clinical care
• Cost saving
• No adverse events
Questions?
References


- Fraser, D., Spiva, L., Forman, W., Hallen, C. Original research: Implementation of an early mobility program in an ICU. *AJN*. 2015; 115(12)
References (cont.)


References (cont.)
