Achieving Evidence Based Outcomes of Patient Mobility & Pressure Injury Prevention While Preventing Caregiver Injury

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Disclosures

- Consultant-Michigan Hospital Association Keystone Center
- Consultant/Faculty for CUSP for MVP—AHRQ funded national study
- Subject matter expert CAUTI, CLABSI, HAPU, Safety culture
- Consultant and speaker bureau for Sage Products LLC
- Consultant and speaker bureau for Hill-Rom Inc
- Consultant and speaker bureau for Eloquest Healthcare
Objectives

1. Discuss transforming a culture that creates safety for the patient and staff while achieving evidence-based outcomes

2. Outline evidence-based prevention strategies for incontinence-associated dermatitis, friction reduction, and pressure injury prevention

3. Describe key care process changes that lead to a successful reduction of skin injury and prevent healthcare worker injury
Changing Culture-Critical to Success

• “Culture does not change because we desire to change it. Culture changes when the organization is transformed; the culture reflects the realities of people working together every day.”
  - Frances Hesselbein
Culture of Safety

• Safety is avoiding both short- and long-term harm to people resulting from unsafe acts and preventable adverse events.

• Current infrastructure “silos” safety programs, creating one for patients, another for workers, and yet another for others who may be at risk. (Quality department, Risk Management, Employee Health, SPH)

• The organizational culture, principles, methods, and tools for creating safety are the same, regardless of the population whose safety is the focus.

• A true culture of safety—and the organization leaders who create and sustain it—will not be considered legitimate and genuine if the culture excludes some groups within the organization.

What does it mean to be in a safe culture for you & your patient?
Changing the Paradigm

Culture of Safety in Healthcare

Patient Safety

Safety Culture for the Patient & the HCW
Core Organizational Value

Culture of Safety for Healthcare Workers

Healthcare Worker Safety
Notes on Hospitals: 1859

• “It may seem a strange principle to enunciate as the very first requirement in a Hospital that it should do the sick no harm.”
  - Florence Nightingale

Advocacy = Safety
Protect The Patient From Bad Things Happening on Your Watch

Implement Interventional Patient Hygiene
Interventional Patient Hygiene

• Hygiene…the science and practice of the establishment and maintenance of health

• Interventional Patient Hygiene….nursing action plan directly focused on fortifying the patient’s host defense through proactive use of evidence-based hygiene care strategies
The Goal: Patient & Caregiver Safety

How well are we doing?
The Goal: Patient & Caregiver Safety

Repositioning/mobilization of the patient

Patient skin injury

Caregiver Injury
Cumulative Impact on Quality of Life

• “New Walking Dependence” occurs in 16-59% in older hospitalized patients¹

• 65% of patients had a significant functional mobility decline by day 2¹

• 27% still dependent in walking 3 months post discharge²

2. Mahoney 1998
Skeletal Muscle Deconditioning

- Skeletal muscle strength reduces 4-5% every week of bed rest (1-1.5% per day) – recently seen as high as 3-11% for each day in bed
- Without activity the muscle loses protein
- Healthy individuals on 5 days of strict bed rest develop insulin resistance and microvascular dysfunction
- 2 types of muscle atrophy
  - Primary: bed rest, space flight, limb casting
  - Secondary: pathology
- 40 ICU patients, 2,646 observations, patients spent 100% median time in bed, with 99% little or no activity (2017)
- One day of bed rest requires two weeks of reconditioning to restore baseline muscle strength

Do We Even Achieve the Minimum Mobility Standard...

“Q2 Hours..”? 
Body Position: Clinical Practice vs. Standard

• Methodology
  • 74 patients/566 total hours of observation
  • 3 tertiary hospitals
  • Change in body position recorded every 15 minutes
  • Average observation time 7.7 hours
  • Online MD survey

• Results
  • 49.3% of observed time no body position change
  • 2.7% had a q 2 hour body position change
  • 80-90% believed q 2 hour position change should occur but only 57% believed it happened in their ICU
Positioning Prevalence

• Methodology
  • Prospectively recorded, 2 days, 40 ICUs in the UK
  • Analysis on 393 sets of observations
  • Turn defined as supine position to a right or left side lying

• Results:
  • 5 patients prone at any time, 3.8% (day 1) & 5% (day 2) rotating beds
  • Patients on back 46% of observation
  • Left 28.4%
  • Right 25%
  • Head up 97.4%
  • Average time between turns 4.85 hrs (3.3 SD)
  • No significant association between time and age, wt, ht, resp dx, intubation, sedation score, day of wk, nurse/patient ratio, hospital

Goldhill DR et al. Anaesthesia 2008;63:509-515
Environmental Scan of EM Practices

• 687 randomly selected ICU’s stratified by regional density & size - 500 responded (73% response rate)
• Demographics:
  • 51% academic affiliation, 58% mixed medical/surgical or 22% medical, with a median of 16 beds (12–24)
  • 34% dedicated PT or OT for the ICU
  • Performed a median of 6 days, 52% began on admission

Factors associated with EMP:
• Dedicated PT/OT
• Written sedation protocol
• Daily MDR
• Daily written goals
Outcomes of Early Mobility Programs

- ↓ incidence of VAP
- ↓ time on the ventilator
- ↓ days of sedation
- ↓ incidence of skin injury
- ↓ delirium
- ↑ ambulatory distance
- Improved function
- ↓ in hospital readmissions
- ↓ ICU & hospital LOS

Thomsen GE, et al. CCM 2008;36;1119-1124
Winkelman C et al, CCN,2010;30:36-60
Corcoran JR, et al. PMR J, 2016 in press
IF AT FIRST YOU DON'T SUCCEED, YOU'RE RUNNING ABOUT AVERAGE
What are Ergonomic Risk Factors?

Duration of Exposure
Force
Ergonomic Risk Factors
Posture
Repetition
Oh, my aching back!

• Back pain incidence in nursing:
  • 8 out of 10 nurses work despite experiencing musculoskeletal pain¹
  • 62% of nurses report concern regarding developing a disabling musculoskeletal injury¹
  • 56% of nurses report musculoskeletal pain made worse by their job¹
  • Nursing assistants and RNs experience the highest rate of non-fatal occupational injuries and illnesses of ANY industry sector (including manufacturing and construction)²

Contributing Factors to Injury

• Healthcare is the only industry that considers 100 pounds to be a “light” weight

• Other professions use assistive equipment when moving heavy items

• On average, nurses and assistants lift 1.8 tons per shift\(^1\)

<table>
<thead>
<tr>
<th>Year</th>
<th>Ownership</th>
<th>Occupation</th>
<th>Total Cases</th>
<th>Incidence Rate</th>
<th>Medial Days Away from Work</th>
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<tbody>
<tr>
<td>2009</td>
<td>Private Industry</td>
<td>RN’s</td>
<td>8,760</td>
<td>51.6</td>
<td>8</td>
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<td>2010</td>
<td>Private Industry</td>
<td>RN’s</td>
<td>9,260</td>
<td>53.7</td>
<td>6</td>
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<tr>
<td>2011</td>
<td>Private Industry</td>
<td>RN’s</td>
<td>10,210</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td>2012</td>
<td>Private Industry</td>
<td>RN’s</td>
<td>9,900</td>
<td>58.5</td>
<td>8</td>
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<tr>
<td>2013</td>
<td>Private Industry</td>
<td>RN’s</td>
<td>9,820</td>
<td>56.2</td>
<td>7</td>
</tr>
<tr>
<td>2014</td>
<td>Private Industry</td>
<td>RN’s</td>
<td>9,820</td>
<td>55.3</td>
<td>9</td>
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<tr>
<td>2014</td>
<td>Private Industry</td>
<td>NA</td>
<td>18,510</td>
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<td>2005</td>
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<td>RN’s</td>
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<td>2004</td>
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<td>RN’s</td>
<td>8,810</td>
<td>-</td>
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<tr>
<td>2003</td>
<td>Private Industry</td>
<td>RN’s</td>
<td>10,050</td>
<td>-</td>
<td>6</td>
</tr>
</tbody>
</table>

* Incidence rate per 10,000 FTE

Background of the Problem

- HAPU are the 4th most common preventable medical error in the United States
- 2.5 million patients are treated for HAPU annually in acute care
- NDNQI data base: critical care: 7% med-surg: 1-3.3%
- Acute care: 0-12%, critical care: 3.3% to 53.4% (International Guidelines)
- Most severe pressure ulcer: sacrum (44.8%) or the heels (24.2%)
- Pressure ulcers cost $9.1-$11.6 billion per year in the US
  - Cost of individual patient care ranges from $20,900 to $151,700 per pressure ulcer
  - 17,000 lawsuits are related to pressure ulcers annually
- 60,000 persons die from pressure ulcer complications each year
- National healthcare cost $10.5-17.8 billion dollars for 2010

Skin & Immobility Prevention Strategies

Skin Risk Factors
- Moisture
- Pressure
- Shear
- Friction

Caregiver Risk
- Repetitive motion, Lifting
- Repetitive motion, lifting & limb holding
- Repetitive motion, dragging, patient weight

Strategies:
- Clean & Protect
- Reduce Pressure & Shear
- In-bed & Out-of-Bed Mobility
The Goal: Patient and Caregiver Safety

Patient Progressive Mobility
Early Physical and Occupational Therapy in Mechanically Ventilated Patients

- Prospective randomized controlled trial from 2005-2007
- 1,161 screen, 104 patients mechanically ventilated < 72hrs, functionally independent at baseline met criteria
- Randomized to:
  - Early exercise of mobilization during periods of daily interruption of sedation (49 pts)
  - Daily interruption of sedation with therapy as ordered by the primary care team (55 pts)
  - Primary endpoint: number of patients returning to independent functional status at hospital discharge able to perform activities of daily living and walk (independently)

# Early Physical and Occupational Therapy in Mechanically Ventilated Patients


<table>
<thead>
<tr>
<th></th>
<th>Intervention (n=49)</th>
<th>Control (n=55)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time from intubation to first PT/OT session (days)</td>
<td>1.5 (1.0-2.1)</td>
<td>7.4 (6.0-10.9)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Independent ADLs total at ICU discharge</td>
<td>3 (0-5)</td>
<td>0 (0-5)</td>
<td>0.15</td>
</tr>
<tr>
<td>Independent ADLs total at hospital discharge</td>
<td>6 (0-6)</td>
<td>4 (0-6)</td>
<td>0.06</td>
</tr>
<tr>
<td>MRC examination score at hospital discharge</td>
<td>52 (25-58)</td>
<td>48 (35-58)</td>
<td>0.38</td>
</tr>
<tr>
<td>Hand-grip strength at hospital discharge (kg-force)</td>
<td>35 (10-58)</td>
<td>35 (0-57)</td>
<td>0.67</td>
</tr>
<tr>
<td>Greatest walking distance at hospital discharge (m)</td>
<td>33.4 (9-31.4)</td>
<td>0 (0-30.4)</td>
<td>0.004</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time from intubation to milestones achieved (days)</th>
<th>Out of bed</th>
<th>Standing</th>
<th>Marching in place</th>
<th>Transferring to a chair</th>
<th>Walking</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.7 (1.1-3.0)</td>
<td>3.2 (15.5-6)</td>
<td>2.3 (1.6-5.8)</td>
<td>3.1 (1.8-4.5)</td>
<td>3.8 (1.9-5.8)</td>
</tr>
<tr>
<td></td>
<td>6.6 (4.2-8.3)</td>
<td>6.0 (4.5-8.9)</td>
<td>6.2 (4.6-9.6)</td>
<td>6.2 (4.5-8.4)</td>
<td>7.3 (4.9-9.6)</td>
</tr>
</tbody>
</table>

Data are median (IQR). ADLs, activities of daily living; ICU, intensive care unit; MRC, Medical Research Council. PT/OT = physical therapy and occupational therapy; MRC examination scale 0-60.

Table 4: Function and muscle strength outcomes according to study group.
Early Physical and Occupational Therapy in Mechanically Ventilated Patients

- Safe
- Well tolerated
- ↓ duration of delirium
- ↑ VFD
- Functional independence at discharge 59% protocol group vs. 35% in control arm

Protocol Driven Mobility Program: Impacting Neurological Outcomes

- Pre-post intervention study
- Large academic NICU
- 637 patients
  - 260 pre
  - 377 post
- Intervention: Early Progressive Mobility Protocol
  - Exclusion criteria
  - Readiness criteria
  - Started on admission
  - Encouraged to use ICU bed features & lifts to assist
  - Protocol placed at bedside

Protocol Driven Mobility Program: Impacting Neurological Outcomes

Multivariate analysis done to control for group differences:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Preintervention</th>
<th>Postintervention</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Physiology and Chronic Health Evaluation III score*</td>
<td>59.0 (2.64)</td>
<td>58.7 (2.54)</td>
<td>0.90</td>
</tr>
<tr>
<td>Length of stay</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hospital, d (so)</td>
<td>15.16 (0.96)</td>
<td>10.21 (1.04)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Neurologic ICU, d (so)</td>
<td>7.37 (0.68)</td>
<td>4.75 (0.64)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Psychologic factors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Depression, mean (so)</td>
<td>0.76 (0.22)</td>
<td>0.51 (0.22)</td>
<td>0.12</td>
</tr>
<tr>
<td>Anxiety, mean (so)</td>
<td>0.69 (0.21)</td>
<td>0.42 (0.21)</td>
<td>0.088</td>
</tr>
<tr>
<td>Hostility, mean (so)</td>
<td>0.38 (0.14)</td>
<td>0.27 (0.14)</td>
<td>0.31</td>
</tr>
<tr>
<td>Combined, mean (so)</td>
<td>1.80 (0.50)</td>
<td>1.21 (0.48)</td>
<td>0.11</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Factor</th>
<th>Postintervention Odds Ratio (95% CIs)</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Highest mobility achieved</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt; Level 7</td>
<td>1.63 (1.16, 2.33)</td>
<td>0.006</td>
</tr>
<tr>
<td>3 levels†</td>
<td>1.92 (1.43, 2.58)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>4 levels†</td>
<td>1.78 (1.32, 2.41)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Mortality, 30 d</td>
<td>0.95 (0.58, 1.59)</td>
<td>0.87</td>
</tr>
<tr>
<td>Discharge home</td>
<td>1.53 (1.03, 2.27)</td>
<td>0.033</td>
</tr>
<tr>
<td>Deep vein thrombosis</td>
<td>1.90 (1.00, 3.60)</td>
<td>0.05</td>
</tr>
<tr>
<td>Deep vein thrombosis†</td>
<td>1.73 (0.95, 3.15)</td>
<td>0.072</td>
</tr>
<tr>
<td>Deep vein thrombosis‡</td>
<td>1.52 (0.83, 2.80)</td>
<td>0.18</td>
</tr>
</tbody>
</table>

Determining Readiness

- Perform initial mobility screen w/in 8 hours of ICU admission & daily
  - PaO2/FiO2 ≥ 250
  - PEEP <10
  - O2 Sat > 90%
  - RR 10-30
  - No new onset cardiac arrhythmias or ischemia
  - HR >60 <120
  - MAP >55 <140
  - SBP >90 <180
  - No new or increasing vasopressor infusion
  - RASS > -3

Patient stable, start at Level II & progress

Patient is unstable, start at Level I & progress

### Progressive Mobility Continuum

**LEVEL I**
- **Goal:** Clinical stability, passive ROM
- **Tolerates:**
  - Level I Activities

**LEVEL II**
- **Goal:** Upright sitting, increased strength and moves arm against gravity
- **Tolerates:**
  - Level II Activities

**LEVEL III**
- **Goal:** Increased trunk strength, moves leg against gravity and readiness to weight bear
- **Tolerates:**
  - Level III Activities

**LEVEL IV**
- **Goal:** Stands w/min. to mod. assist, able to march in place, weight bear and transfer to chair
- **Tolerates:**
  - Level IV Activities

**LEVEL V**
- **Goal:** Increase distance in ambulation & ability to perform some ADLs
- **Tolerates:**
  - Level V Activities

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**Activity: Q 2 hr turning**
- **HOB > 30°**
  - Passive/Active ROM 3x/d
  - 1. HOB 45° X 15 min.
  - 2. HOB 45°, Legs in dependent position X 15 min.
  - 3. HOB 65°, Legs in dependent position X 15 min.
  - 4. Step (3) & full chair mode X20 min. 3x/d
    - Full assist into cardiac chair 2x/day

**Activity: PT consultation pm**
- OT consultation pm

**Activity: PT x 2 daily**
- OT consult for ADL’s

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**Activity:**
- **HOB > 30°**
  - Passive ROM 3x/d performed by RN, or UAP
  - CLRT/Pronation initiated if patient meets criteria based on institutional practice
  - OR
  - Q 2 hr turning

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**For each position/activity change allow 5-10 minutes for equilibration before determining the patient is intolerant.***

**If the patient is intolerant of current mobility level activities, reassess and place in appropriate mobility level***

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*Mobility is the responsibility of the RN, with the assistance from the RT’s Unlicensed Assistive Personnel and PT/OT. PT and OT may assist the team with placement to the appropriate mobility level of activity, always prioritizing patient and provider safety. Placement is based on clinical judgment.*

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**References:**

# B.M.A.T. – Banner Mobility Assessment Tool for Nurses

<table>
<thead>
<tr>
<th>Test</th>
<th>Task</th>
<th>Response</th>
<th>Fail = Choose Most Appropriate Equipment Device(s)</th>
<th>Pass</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assessment Level 1</strong>&lt;br&gt;Assessment of:&lt;br&gt; - Cognition&lt;br&gt; - Trunk Strength&lt;br&gt; - Seated balance</td>
<td><strong>Sit and Shake:</strong> From a semi-reclined position, ask patient to sit upright and rotate* to a seated position at the side of the bed; may use bedrail.&lt;br&gt;Note patient’s ability to maintain bedside position.&lt;br&gt;Note: Consider your patient’s cognitive ability, including orientation and CAM assessment if applicable.</td>
<td><strong>Sit:</strong> Patient is able to follow commands, has some trunk strength; caregivers may be able to try weight-bearing if patient is able to maintain seated balance greater than two minutes (without caregiver assistance).&lt;br&gt;<strong>Shake:</strong> Patient has significant upper body strength, awareness of body in space, and grasp strength.</td>
<td><strong>MOBILITY LEVEL 1</strong>&lt;br&gt;- Use total lift: with sling and/or repositioning sheet and/or straps.&lt;br&gt;- Use lateral transfer devices such as roll board, friction reducing (slide sheets, tube), or air assisted device.&lt;br&gt;<strong>NOTE:</strong> If patient has ‘strict bed rest’ or bilateral ‘non-weight bearing’ restrictions do not proceed with the assessment; patient is MOBILITY LEVEL 1.</td>
<td>Passed Assessment Level 1 = Proceed with Assessment Level 2.</td>
</tr>
<tr>
<td><strong>Assessment Level 2</strong>&lt;br&gt;Assessment of:&lt;br&gt; - Lower extremity strength&lt;br&gt; - Stability</td>
<td><strong>Stretch and Point:</strong> With patient in seated position at the side of the bed, have patient place both feet on the floor (or stool) with knees no higher than hips.&lt;br&gt;Ask patient to stretch one leg and straighten the knee, then bend the ankle/ flex and point the toes. If appropriate, repeat with the other leg.&lt;br&gt;Note: Consider your patient’s cognitive ability, including orientation and CAM assessment if applicable.</td>
<td><strong>Patient exhibits upper and lower extremity stability, strength and control.</strong>&lt;br&gt;May test only one leg and proceed accordingly (e.g., stroke patient, patient with ankle in cast).</td>
<td><strong>MOBILITY LEVEL 2</strong>&lt;br&gt;- Use total lift for patient unable to weight-bear on at least one leg.&lt;br&gt;- Use sit-to-stand life for patient who can weight-bear on at least one leg.</td>
<td>Passed Assessment Level 2 = Proceed with Assessment Level 3.</td>
</tr>
<tr>
<td><strong>Assessment Level 3</strong>&lt;br&gt;Assessment of:&lt;br&gt; - Lower extremity strength for standing&lt;ref&gt;Anchor test: <strong>Assessment of:</strong>&lt;/ref&gt;</td>
<td><strong>Stand:</strong> Ask patient to elevate off the bed or chair (seated to standing) using an assistive device (cane, bedrail). Patient should be able to raise buttocks off bed and hold for a count of five. May repeat once.&lt;br&gt;Note: Consider your patient’s cognitive ability, including orientation and CAM assessment if applicable.</td>
<td><strong>Patient exhibits upper and lower extremity stability and strength.</strong>&lt;br&gt;May test with weight-bearing on only one leg and proceed accordingly (e.g., stroke patient, patient with ankle in cast).&lt;br&gt;If any assistive device (cane, walker, crutches) is needed, patient is Mobility Level 3.</td>
<td><strong>MOBILITY LEVEL 3</strong>&lt;br&gt;- Use non-powered raising/stand aid; default to powered sit-to-stand lift if no stand aid available.&lt;br&gt;- Use total lift with ambulation accessories.&lt;br&gt;- Use assistive device (cane, walker, crutches).&lt;br&gt;<strong>NOTE:</strong> Patient passes Assessment Level 3 but requires assistive device to ambulate or cognitive assessment includes poor safety awareness; patient is MOBILITY LEVEL 3.</td>
<td>Passed Assessment Level 3 AND no assistive device needed = Proceed with Assessment Level 4. Consult with Physical Therapist when needed and appropriate.</td>
</tr>
<tr>
<td><strong>Assessment Level 4</strong>&lt;br&gt;Assessment of:&lt;br&gt; - Standing balance&lt;br&gt; - Gait</td>
<td><strong>Walk:</strong> Ask patient to march in place at bedside. Then ask patient to advance step and return each foot. Patient should display stability while performing tasks. Assess for stability and safety awareness.</td>
<td><strong>Patient exhibits steady gait and good balance while marching, and when stepping forwards and backwards.</strong>&lt;br&gt;Patient can maneuver necessary turns for in-room mobility.&lt;br&gt;Patient exhibits safety awareness.</td>
<td><strong>MOBILITY LEVEL 3</strong>&lt;br&gt;<strong>MODIFIED INDEPENDENCE</strong>&lt;br&gt;Passed = No assistance needed to ambulate; use your best clinical judgement to determine need for supervision during ambulation.</td>
<td>Boyton T, Am Nurse Today, 2014 suppl</td>
</tr>
</tbody>
</table>
Consensus on Safe Criteria for Active Mobilization

• Systematic review performed; 23 international experts gathered to reach consensus

<table>
<thead>
<tr>
<th>Level</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green</td>
<td>Low risk of an adverse event. Proceed as usual according to each ICU’s protocols and procedures.</td>
</tr>
<tr>
<td>Yellow</td>
<td>Potential risk and consequences of an adverse event are higher than green, but may be outweighed by the potential benefits of mobilization. The precautions or contraindications should be clarified prior to any mobilization episode. If mobilized, consideration should be given to doing so gradually and cautiously.</td>
</tr>
<tr>
<td>Red</td>
<td>Significant potential risk or consequences of an adverse event. Active mobilization should not occur unless specifically authorized by the treating intensive care specialist in consultation with the senior physical therapist and senior nursing staff.</td>
</tr>
</tbody>
</table>

• Categories:
  • Respiratory, Cardiovascular, Neurological, other considerations.

• Consensus reached on all criteria:
  • If no other contraindications; presence of vasoactives, endotracheal tube, FIO2 < 60% with SaO2 90% & RR < 30/min were considered safe criteria for mobilization

Hodgson CL, et. al Critical Care, 2014;18:658
Achieving In-Bed and Out-of-Bed Mobility While Protecting the Patient and Caregiver
Skin & Immobility Prevention Strategies

Skin Risk Factors
- Moisture
- Pressure
- Shear
- Friction

Clean & Protect

Reduce Pressure & Shear

In-bed & Out-of-Bed Mobility

Caregiver Risk
- Repetitive motion, Lifting
- Repetitive motion, lifting & limb holding
- Repetitive motion, dragging, patient weight
Building Resiliency into Interventions

- Forcing Functions and Constraints
- Automation and Computerization
- Standardization and Protocols
- Checklist and Independent Check Systems
- Rules and Policies
- Education and Information
- Vague Warning – “Be More Careful!”

STRENGTH OF INTERVENTION
- Strongest
- Weakest
NIOSH (National Institute of Occupational Safety and Health) Recommendations for Safe Patient Handling

• Maximum recommended weight limit set for patient lifting
  • The weight being lifted can be estimated
  • When patient is cooperative
  • The lift is smooth and slow
• Maximum recommended limits set for patient push/pull activity
• Proper body mechanics alone will not prevent patient handling injury
• Safe work practices

It is not safe to manually move patients

2. Hignett, 2003
What is Safe Patient Handling?

• Manual Patient Handling
  • The transporting or supporting of a patient by hand or bodily force, including pushing, pulling, carrying, holding, and supporting of the patient or a body part.

• Safe Patient Handling
  • Evidence-based approach to reducing risk to caregivers. Includes risk assessment, use of equipment, patient assessment, algorithms, peer safety leaders, and after-action reviews.

Evidence-Based Strategies for a Comprehensive Safe Patient Handling and Mobility (SPHM) Program

1. Ergonomic Assessment Protocol
2. Patient Handling Assessment Criteria and Decision Algorithms
3. Peer Leaders
4. State-of-the-Art Equipment
5. After Action Reviews
6. No Lift Policy

EBP Recommendations to Achieve Offloading & Reduce Pressure (A)

• Turn & reposition every (2) hours (avoid positioning patients on a pressure injury)
  • Repositioning should be undertaken to reduce the duration & magnitude of pressure over vulnerable areas
  • Consider right surface with right frequency
  • Cushioning devices to maintain alignment /30° side-lying & prevent pressure on bony prominences
    • Between pillows and wedges, the wedge system was more effective in reducing pressure in the sacral area (healthy subjects)
  • Assess whether actual offloading has occurred
  • Use lifting device or other aids to reposition & make it easy to achieve the turn

EBP Recommendations to Reduce Shear & Friction

• Loose covers & increased immersion in the support medium increase contact area
• Prophylactic dressings: emerging science
• Use lifting/transfer devices & other aids to reduce shear & friction.
  • Mechanical lifts
  • Transfer sheets
  • 2-4 person lifts
  • Turn & assist features on beds
• Do not leave moving and handling equip underneath the patient, unless it is specifically designed for this purpose

Systematic Review: Use of Prophylactic Dressing in Pressure Injury Prevention

• 21 studies met the criteria for review
• 2 RCTs, 9 had a comparator arm, 5 cohort studies, 1 within-subject design where prophylactic dressings were applied to one trochanter with the other trochanter dressing free

Evaluated nasal bridge device injury prevention
Evaluated sacral pressure injury prevention

EBP Recommendations to Reduce Shear & Friction

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Human Factor Engineering & Ergonomics

• Human Factors
  • The application of scientific knowledge about human strengths and limitations to the design of systems in the work environment to ensure safe and satisfying performance.

• Ergonomics
  • The science of fitting workplace conditions and job demands to the capabilities of the working population. A good fit between employee capabilities, workplace conditions, and job demands helps ensure high productivity, avoid illness and injury, and increase satisfaction in the workforce.

Translates to higher quality patient care and fewer adverse events for workers and patients.
The Tale of Ceiling Lifts

- Mechanical lifts are often not used to the extent that was intended, reportedly due to poor access, lack of space for use or storage, inadequate staffing, or increased time required for use of the lift compared to manual methods.¹,²

- Studies have shown that ceiling lifts may not be suitable for all patient handling tasks.³,⁴

- Implementing a ceiling lift program significantly reduced (58% reduction, p = 0.011) the rate of musculoskeletal injuries (MSI) to nurses and care aides caused by lifting and transferring.

- Study showed that ceiling lifts did not positively impact rates of MSI caused by repositioning patients in bed.³

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1. Daynard et al., 2001
2. Evanoff et al., 2003; Garg et al., 1991a, b.
3. Ronald et al., 2002
4. Villeneuve, 1998
Achieving the Use of the Evidence for Pressure Injury Reduction

- Resource & System
  - Breathable glide sheet/stays
  - Foam wedges
  - Microclimate control
  - Reduce layers of linen
  - Wick away moisture body pad
  - Protects the caregiver

Factors Impacting the Ability to Achieve Quality Nursing Outcomes at the Point of Care

Comparative Study of Two Methods of Turning & Positioning

- Non-randomized comparison design
- 59 neuro/trauma ICU mechanically ventilated patients
- Compared SOC: pillows/draw sheet vs turn and position system (breathable glide sheet/foam wedges/wick away pad)
- Measured PU incidence, turning effectiveness & nursing resources

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<td>BMI</td>
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### Comparative Study of Two Methods of Turning & Positioning

#### Results:
- Nurse satisfaction 87% versus 34%
- 30° turn achieved versus -15.4 in SOC/7.12 degree difference at 1hr (p<.0001)

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<td>pulled up in bed</td>
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<td># of staff required to</td>
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<td>turn patient</td>
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<sup>a</sup> PU development with 24hrs of admission

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PU = Pressure Ulcer  
PI = Pressure Injury
Impact of a Turn & Position Device on PI 
& Staff Time

- Prospective, QI study (1 SICU & 1 MICU)
- 2 phases
  - SOC: pillows, underpads, standard low airloss bed, and additional staff if required
  - Interventional: turn and position system, a large wicking pad (part of the product)
  - Inclusion criteria: newly admitted, non-ambulatory, required 2 or more to assist with turning/repositioning
  - Turning procedures were timed/admitting till ICU discharge
- Results
  - No difference in sociodemographic and clinical data between the groups
  - Phase 1: 14 patients (28%) Stage II sacral PI
  - Phase 2: zero sacral PI (p<.0001)
- Timing:
  - Phase 1: 16.34 mins (range 4-60min) SD= 10.08
  - Phase 2: 3.58 mins (range 1.12-8.48) SD = 2.31 (p=0.0006)

Reducing HAPI & Patient Handling Injuries

- Compared pre-implementation turning practice: pillows/draw sheet vs turn and position system (breathable glide sheet/foam wedges/wick away pad)
- Baseline: November 2011-August 2012
- Implementation period: November 2012 to August 2015
- 3,660 patients
- Compared HAPI rates, patient handling injuries, and cost

Way H, Am JSPHM, 2016;6(4):160-165
In-Bed Technology
Transition: In-Bed to Out-of-Bed & Back
Out-of-Bed Technology
Current seating positioning challenges

- Airway & epiglottis compressed
- Body alignment
- Shear/Friction
- Sacral pressure
- Frequent repositioning & potential caregiver injury
- Potential risk of sliding from chair
Repositioning patients in chairs: an improved method (SPS)

• Study the exertion required for 3 methods of repositioning patients in chairs

• 31 caregiver volunteers

• Each one trial of all 3 reposition methods

• Reported perceived exertion using the Borg tool, a validated scale

Method 1: 2 caregivers using old method of repositioning
246% greater exertion than SPS

Method 2: 2 caregivers with SPS

Method 3: 1 caregiver with SPS
52% greater exertion than method 2

Ambulation Assist Devices
“Even if you are on the right track, you will get run over if you just sit there.”

Will Rogers
Progressive Mobility + Caregiver Safety + Skin Safety
Challenges to Mobilizing Patients

• Potentially Modifiable Barriers
  • Patient – related barriers (50%)
    • Hemodynamic instability, ICU devices, physical & neuropysch
  • Structural (18%)
    • Human or technological Resources
  • ICU culture (18%)
    • Knowledge/ Priority/ Habits
  • Process related (14%)
    • Service delivery/ lack of coordination
    • Clinician function

Decision-Making Tree for Patients Who Are Hemodynamically Unstable With Movement

1. Screen for mobility readiness within 8 hrs of admission to ICU & daily initiate in-bed mobility strategies as soon as possible

2. Is the patient hemodynamically unstable with manual turning?
   - O₂ saturation ≤ 90%
   - New onset cardiac arrhythmias or ischemia
   - HR < 60 <120
   - MAP < 55 >140
   - SPB < 90 >180
   - New or increasing vasopressor infusion

   - Yes
   - No

3. Is the patient still hemodynamically unstable after allowing 5-10 minutes’ adaption post-position change before determining tolerance?

   - Yes
   - No

4. Screen for mobility readiness within 8 hours of admission to ICU & daily initiate in-bed mobility strategies as soon as possible

   - Yes
   - No

5. Has the manual position turn or HOB elevation been performed slowly?

   - Yes
   - No

6. Initiate continuous lateral rotation therapy via a protocol to train the patient to tolerate turning

   - Yes

   - No

   - Begin in-bed mobility techniques and progress out-of-bed mobility as the patient tolerates

   - Allow the patient a minimum of 10 minutes of rest between activities, then try again to determine tolerance

   - Try the position turn or HOB maneuver slowly to allow adaption of cardiovascular response to the inner ear position change

HOB = Head of Bed
HR = Heart Rate
MAP = Mean Arterial Pressure
SPB = Systolic Blood Pressure

**Example Guideline**

**Clinical Findings Which Prevent Patient Turning**

1. Development of life threatening arrhythmia with symptomatic response (VFIB/VTACH/SVT) This does NOT include asymptomatic AFIB.

2. Active Fluid Resuscitation: (i.e. no volume going in= no systemic blood pressure).

3. Active Hemorrhaging:
   - Following Cardiac Surgery/Active Tamponade
   - Massive GI bleeding with use of Blakemore tube.
   - Active hemorrhage following Trauma.

4. Change in baseline hemodynamic parameters (BP, HR, Oxygen Saturation, RR, etc) that does not recover within 10 Minutes of position change and is not an expected result based on diagnosis.

**Recommended Interventions for the Unstable Patient**

*IF PATIENT IS DEEMED TOO UNSTABLE TO TURN BY ABOVE PARAMETERS:*

A TRIAL TURN SHOULD BE ATTEMPTED AT LEAST EVERY 8 HOURS TO DETERMINE ABILITY TO RESUME FREQUENT TURNING AT LEAST EVERY 2 HOURS

1. Provide mini-turns
2. Weight shift patient at least every 30 minutes
3. Elevate heels from surface of bed
4. Reposition patient's head, arms and legs at least every hour, consider passive ROM
5. Consider use of Continuous Lateral Rotation Therapy to prevent development of "gravitational equilibrium". Begin: SLOW AND LOW angles of turning to gauge patient response.
6. When turning patient: GO SLOW! Provide serial small turns from supine to lateral position to achieve linen changes, hygiene checks, and reposition with wedges and pillows.

**UNSTABLE FRACTURES**

1. Patients with unstable pelvic injuries LOG ROLL PATIENT ONLY with approval of Attending MD. Consider wedges or pillows placed between the legs to maintain proper alignment.
2. DO NOT use continuous lateral rotation therapy (CLRT) with unstable spinal fractures: these patients should be positioned with multiple wedges to maintain proper alignment.
3. Cervical Fractures / UNSTABLE: Patient must have appropriately fitted cervical collar in place. Ensure security and proper positioning of collar, then log roll patient, and wedge in proper alignment.

“Even if you are on the right track, you will get run over if you just sit there.”

Will Rogers
How do we make it happen?
Driving Change

- Gap analysis
- Build the will
- Protocol development

Structure

- Make it prescriptive
- Overcoming barriers
- Daily integration

Process

Outcomes
The Goal: Patient and Caregiver Safety

- ↓ Repetitive motion injury
- ↓ Musculoskeletal injury
- ↓ Days away from work
- ↓ Staffing challenges
- ↓ Loss of experienced staff
- Nursing shortage

- ↓ Skin injury
- ↓ Costs
- ↓ Pain and suffering
- ↓ Hospital LOS
- ↓ ICU LOS

- ↓ Hospital LOS
- ↓ ICU LOS
- ↓ Skin injury
- ↓ CAUTI
- ↓ Delirium
- ↓ Time on the vent

- ↓ Falls
- ↓ Falls with injury
- ↓ Hospital LOS

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