Putting the Pieces of the Puzzle Together: Addressing Modifiable Risk Factors for the Patient in Preventing Hospital Acquired skin Injury while Protecting the Caregiver

Kathleen M Vollman, MSN, RN, CCNS, FCCM, FAAN
Clinical Nurse Specialist/Consultant
ADVANCING NURSING LLC
kvollman@comcast.net
www.vollman.com

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Disclosures for Kathleen Vollman

- 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

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

• Identify and discuss key in-bed and out of bed mobility techniques to successfully achieve your early mobility protocol to improve patient outcomes.

• Outline evidence-based prevention strategies for pressure injury prevention

• Describe key care process changes that lead to a successful reduction of skin injury and prevent healthcare worker injury
“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 patients host defense through proactive use of evidence based hygiene care strategies

Comprehensive Oral Care Plan

Incontinence Associated Dermatitis Prevention Program

Hand Hygiene

Catheter Care

Bathing & Assessment

Pressure Injury Prevention
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!”

Strongest

STRENGTH OF INTERVENTION

Weakest

Berenholtz, S John Hopkins Patient Safety Institute, 2012
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 Health Care

Patient Safety

Culture of Safety for Healthcare Workers

Healthcare Worker Safety

Safety Culture for the Patient & the HCW
Changing the Perception of Safety on Your Unit

- Safety for the patient and healthcare worker are integrated
- Transcends individual improvement initiatives and departmental walls
- High reliable unit/organization: engaged leadership, culture of safety, organizational processes and infrastructure to support safe practices
- Implement and maintain successful worker and patient safety improvement initiatives within your unit & organization.
- Create measurements that integrate patient safety and healthcare worker safety

Castro GM. Am J SPHM, 2015;5(1)34-35
Add ANA-
The Goal: Patient & Caregiver Safety

- Patient Progressive Mobility
- Safe Patient Handling
- Reduce Risk of Pressure Injuries
- Falls

Leadership
How Well Are We Doing?
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

Krishnagopalan S. Crit Care Med 2002;30:2588-2592
Positioning Prevalence

• Methodology
  – Prospectively recorded, 2 days, 40 ICU’s 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
Environmental Scan of EM Practices

- 687 randomly selected ICU’s stratified by regional density & size- 500 responded (73% response rate)
- Demographics:
  - 51% academic affiliation, mixed medical/surgical (58%) or medical (22%) 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

Thomsen GE, et al. CCM 2008;36;1119-1124
Winkelman C et al, CCN,2010;30:36-60
IF AT FIRST YOU DON'T SUCCEED, YOU'RE RUNNING ABOUT AVERAGE
Background of the Problem

- HAPU are the 4th leading preventable medical error in the United States
- 2.5 million patients are treated 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 yr.
- National health care cost $10.5-17.8 billion dollars for 2010

http://www.ahrq.gov/professionals/systems/hospital/pressureulcertoolkit/putool1.html#11

Cambridge Media: Osborne Park: Western Australia;2014.
Clarification of Definitions:

- Pressure Injury to replace Pressure Ulcer
- Accurately describes pressure injuries of both intact and ulcerated skin

Stage I and Deep Tissue Injury (DTI) describe intact skin

Stage II through IV describe open ulcers

PRESSURE INJURY
Moisture Injury: Incontinence Associated Dermatitis

- Inflammatory response to the injury of the water-protein-lipid matrix of the skin
  - Caused by prolonged exposure to urinary and fecal incontinence
- Top-down injury
- Physical signs on the perineum & buttocks
  - Erythema, swelling, oozing, vesiculation, crusting and scaling
- Skin breaks 4x more easily with excess moisture than dry skin

Brown DS & Sears M. OWM 1993;39:2-26
IAD: Multisite Epidemiological Study

- 5,342 patients in 424 facilities in Acute & Long Term Care in US
- Prevalence study
  - To measure the prevalence of IAD in the acute care setting,
  - To describe clinical characteristics of IAD, and
  - To analyze the relationship between IAD and prevalence of sacral/coccygeal pressure ulcers
- Results: 1716 patients incontinent (44%)
  - 57% both FI and UI, 27% FI, 15% UI
  - 24% IAD rate
    - 60% mild
    - 27% moderate
    - 5% severe
  - 73% was facility acquired
  - ICU a 36% rate
  - IAD 5x more likely to develop a HAPU

Giuliana K. Presented at the CAACN September 25-27th Winnipeg, Manitoba, CA
Gray M. Presenting a Wound Care Conference, 2016, New York City, NY
What are Ergonomic Risk Factors in Healthcare?

- Force
- Repetition
- Posture
- Duration of Exposure
Oh, My Aching Back!

- 8 out of 10 nurses work despite experiencing musculoskeletal pain\(^1\)
- 62% of nurses report concern regarding developing a disabling musculoskeletal injury\(^1\)
- 56% of nurses report musculoskeletal pain is made worse by their job\(^1\)
- Nursing assistants had the 2\(^{nd}\) highest and RNs had the 6\(^{th}\) highest number of musculoskeletal disorders in the U.S.\(^2\)


Oh, My Aching Back!

2014 - 67%-80% of people in the US were morbidly obese, obese or overweight (Flegal et al., 2014)

- Overweight: Body mass index (BMI) of 25.0 to 29.9
- Obesity: BMI of 30.0 to 39
- Morbid Obesity: BMI 40 or higher
Oh, My Aching Back!

- The nation is facing an impending shortage of nurses, which is expected to peak by 2020
- Average age of nurses in the US is 46
- We must improve our ergonomic environment to accommodate older nurses (Buerhaus, 2004)
Contributing Factors to Injury

- Health care 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 (ANA, n.d.)

NIOSH (National Institute of Occupational Safety and Health) Recommendations for Safe Patient Handling

- Maximum recommended weight limit set for patient lifting¹
  - 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 (Hignett, 2003)
- Safe work practices

IT IS NOT SAFE TO MANUALLY MOVE PATIENTS

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.

## Number, Incidence Rate, & Median Days Away From Work for Occupational Injuries RN’s with Musculoskeletal Disorders in US, 2003 – 2014

<table>
<thead>
<tr>
<th>Year</th>
<th>Ownership</th>
<th>Occupation</th>
<th>Total Cases</th>
<th>Incidence Rate*</th>
<th>Median Days Away From Work</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>private industry</td>
<td>RNs</td>
<td>8,760</td>
<td>51.6</td>
<td>8</td>
</tr>
<tr>
<td>2010</td>
<td>Private industry</td>
<td>RNs</td>
<td>9,260</td>
<td>53.7</td>
<td>6</td>
</tr>
<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>9900</td>
<td>58.5</td>
<td>8</td>
</tr>
<tr>
<td>2013</td>
<td>Private Industry</td>
<td>RN</td>
<td>9820</td>
<td>56.2</td>
<td>7</td>
</tr>
<tr>
<td>2014</td>
<td>Private Industry</td>
<td>RN</td>
<td>9820</td>
<td>55.3</td>
<td>9</td>
</tr>
<tr>
<td>2014</td>
<td>Private Industry</td>
<td>NA</td>
<td>18,510</td>
<td></td>
<td>6</td>
</tr>
</tbody>
</table>

* Incidence rate per 10,000 FTE

Significance of Patient Falls

• Falls are the leading cause of hospital–acquired injury and can frequently prolong or complicate hospital stays (Degelau et al., 2012)

• Between 700,000 and 1 million patients suffer a fall in U.S. hospitals each year (Dupree et al., 2014)

• 30-35% of those patients sustain an injury, and approximately 11,000 falls are fatal (Health Research & Educational Trust. 2016, October)

• Falls have been identified by the Centers for Medicare and Medicaid Services as an acquired condition that should not occur (Dupree et al., 2014)
Immobility Risk, Skin Risk Factors

- Moisture
- Pressure
- Shear Friction
- Deconditioning Falls Delirium ICU and Hospital LOS

Mobility, Skin & Fall Prevention Strategies

- Clean & Protect
- Reduce Pressure & Shear
- In-bed Exercise & Out of Bed Mobility

Care Giver Risk

- Repetitive motion, Lifting
- Repetitive motion, Lifting & Limb holding
- Repetitive motion, Dragging, patient weight

Mobility, Skin & Fall Prevention Strategies: Clean & Protect
- In-bed Exercise & Out of Bed Mobility
- Reduce Pressure & Shear
- Moisture
- Pressure
- Shear Friction
- Deconditioning Falls Delirium ICU and Hospital LOS
The Goal: Patient & Caregiver Safety

- Safe Patient Handling
- Patient Progressive Mobility
- Falls
- Reduce Risk of Pressure Injuries
Gap Analysis of Risk Prevention Strategies

- Early Mobility
- Assessment of Risk
- Pressure Injury/Turn/Shear reduction
- Healthcare Worker Safety
- Device Related Injuries
- Managing Incontinence & Other Moisture
- Hemodynamic Instability
Patient Early Mobility
# Progressive Mobility Continuum

**START HERE**

Includes complex, intubated, hemodynamically unstable and stable intubated patients; may include non-intubated patients

Includes intubated, non-intubated hemodynamically stable/stabilizing, no contraindications

<table>
<thead>
<tr>
<th>LEVEL I</th>
<th>LEVEL II</th>
<th>LEVEL III</th>
<th>LEVEL IV</th>
<th>LEVEL V</th>
</tr>
</thead>
<tbody>
<tr>
<td>RASS -5 to -3</td>
<td>RASS -3 &amp; up</td>
<td>RASS -1 &amp; up</td>
<td>RASS 0 &amp; up</td>
<td>RASS 0 &amp; up</td>
</tr>
</tbody>
</table>

*Goal:* clinical stability; passive ROM

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

**Tolerates Level II Activities**

**ACTIVITY:**
- Self or assisted Q 2 hr turning
  - 1. Sitting on edge of bed w/RN, PT, RT assist X 15 min.
  - 2. Progressive bed sitting Position Min.20 min. 3X/d
  - 3. Active Transfer to Chair (OOB) w/ RN/PT/RT assist Min. 3X/d

**Tolerates Level III Activities**

**ACTIVITY:**
- Self or assisted Q 2 hr turning
  - 1. Bed sitting Position Min.30 min. 3X/d
  - 2. Sitting on edge of bed; stand w/ RN, PT, RT assist
  - 3. Active Transfer to Chair (OOB) w/ RN/PT/RT assist Min. 3X/d

**Tolerates Level IV Activities**

**ACTIVITY:**
- Self or assisted Q 2 hr turning
  - 1. Chair (OOB) w/ RN/PT/RT assist Min. 3X/d
  - 2. Meals consumed while dangling on edge of bed or in chair

**Tolerates Level V Activities**

**ACTIVITY:**
- Ambulate progressively longer distances with less assistance x2 or x3/day with RN/PT/RT/UAP

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

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Refer to the following criteria to assist in determining mobility level

- 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

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

*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.*
BMAT Bedside Mobility Assessment Tool

Benefits

- Reduce patient falls
- Communicate the patient’s mobility to all staff
- Increase early mobility
- Improve patient discharge disposition via early mobility
- Decrease patient complications from immobility
- Decrease staff injury related to patient handling

(Boynton, Kumpar and Trudgen, SPHM Conference 2015)
Early Physical and Occupational Therapy in Mechanically Ventilated Patients

- Prospective randomized controlled trial from 2005-2007
- 1161 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>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>15 (1.0-2.1)</td>
<td>7.4 (6.0-10.9)</td>
</tr>
<tr>
<td>Independent ADLs total at ICU discharge</td>
<td>3 (0-5)</td>
<td>0 (0-5)</td>
</tr>
<tr>
<td>Independent ADLs total at hospital discharge</td>
<td>6 (0-6)</td>
<td>4 (0-6)</td>
</tr>
<tr>
<td>MRC examination score at hospital discharge</td>
<td>52 (25-58)</td>
<td>48 (0-58)</td>
</tr>
<tr>
<td>Hand-grip strength at hospital discharge (kg-force)</td>
<td>39 (10-58)</td>
<td>35 (0-57)</td>
</tr>
<tr>
<td>Greatest walking distance at hospital discharge (m)</td>
<td>33.4 (0-91.4)</td>
<td>0 (0-30.4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time from intubation to milestones achieved (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Out of bed</td>
</tr>
<tr>
<td>Standing</td>
</tr>
<tr>
<td>Marching in place</td>
</tr>
<tr>
<td>Transferring to a chair</td>
</tr>
<tr>
<td>Walking</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**

![Activity of daily living bar chart](chart.png)
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
  - Encourage to use ICU bed features & lifts to assist
  - Protocol place at bedside

Protocol Driven Mobility Program: Impacting Neurological Outcomes

Multivariate analysis done to control for group differences:

<table>
<thead>
<tr>
<th>Factor</th>
<th>Adjusted Model Mean (SEM)</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></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>
<td></td>
</tr>
<tr>
<td>Hospital, d (sd)</td>
<td></td>
<td>15.16 (0.96)</td>
<td>10.21 (1.04)</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>Neurologic ICU, d (sd)</td>
<td></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>
<td></td>
</tr>
<tr>
<td>Depression, mean (sd)</td>
<td></td>
<td>0.76 (0.22)</td>
<td>0.51 (0.22)</td>
<td>0.12</td>
</tr>
<tr>
<td>Anxiety, mean (sd)</td>
<td></td>
<td>0.69 (0.21)</td>
<td>0.42 (0.21)</td>
<td>0.088</td>
</tr>
<tr>
<td>Hostility, mean (sd)</td>
<td></td>
<td>0.38 (0.14)</td>
<td>0.27 (0.14)</td>
<td>0.31</td>
</tr>
<tr>
<td>Combined, mean (sd)</td>
<td></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>0.005</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>0.96 (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 $\geq -3$

Patient Stable, Start at Level II & progress

Patient is unstable, start at Level I & progress

Consensus on Safe Criteria for Active Mobilization

- Systematic review performed than 23 international experts gather to reach consensus

<table>
<thead>
<tr>
<th>Category</th>
<th>Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low risk</td>
<td>Low risk of an adverse event. Proceed as usual according to each ICU’s protocols and procedures.</td>
</tr>
<tr>
<td>Medium risk</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>High risk</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>

Consensus reach on all criteria. If no other contraindications; vasoactives, endotracheal tube, FIO2 < 60% with SaO2 90% & RR < 30/min were considered safe criteria

Hodgson CL, et. al Critical Care, 2014;18:658
Achieving In Bed and Out of Bed Mobility While Protecting the Patient and Caregiver
Identify Patients at High Risk
HELLO, LOOK AT OUR BUTTS
Risk Assessment on Admission, Daily, Change in Patient Condition (B)

- Use standard EBP risk assessment tool
- Research has shown Risk Assessment Tools are more accurate than RN assessment alone
- Braden Scale for Predicting Pressure Sore Risk
  - 6 subscales
    - Rate
    - Pressure on tissues
    - Mobility, sensory perception, activity
- Clinical judgment of nurses alone achieve inadequate capacity to assess PU risk
- Extremely obese patient 2x more likely to develop a PU*

www.ihi.org;
Its About the Sub-Scale’s

- Retrospective cohort analysis of 12,566 adults patients in progressive & ICU settings for yr. 2007
- Identifying patients with HAPU Stage 2-4
- Data extracted: Demographic, Braden score, Braden subscales on admission, LOS, ICU LOS, presence of Acute respiratory and renal failure
- Calculated time to event, # of HAPU’s
- Results:
  - 3.3% developed a HAPU
  - Total Braden score predictive (C=.71)
  - Subscales predictive (C=.83)

Multivariate model included 5 Braden subscales, surgery and acute respiratory failure $C=0.91$ (Mobility, Activity and sensory perception more predictive when combined with moisture or shear and friction)
Vasopressors/Pressure Injury

- Retrospective correlation design
- 306 medical surgical and CV ICU patients who receive vasopressors
- Examine the type, dose and duration of vasopressor agents and PU development

Results
- 13% PI rate
- MV > 72 hours 23x more likely to develop a PI
- Receiving 2 vasopressor (Norepi & vasopressin) significant

Significant Predictors of PI Development

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>SE</th>
<th>Wald</th>
<th>P</th>
<th>Exp (B)</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiac arrest</td>
<td>1.359</td>
<td>0.605</td>
<td>3.831</td>
<td>.05</td>
<td>3.894</td>
<td>0.998-15.188</td>
</tr>
<tr>
<td>Mechanical ventilation &gt; 72 hours</td>
<td>3.161</td>
<td>0.664</td>
<td>22.686</td>
<td>&lt;.001</td>
<td>23.604</td>
<td>6.427-86.668</td>
</tr>
<tr>
<td>Hours of MAP &lt; 60 mm Hg while receiving vasopressors</td>
<td>0.092</td>
<td>0.037</td>
<td>6.199</td>
<td>.01</td>
<td>1.096</td>
<td>1.020-1.178</td>
</tr>
<tr>
<td>Use of vasopressin</td>
<td>1.572</td>
<td>0.542</td>
<td>8.423</td>
<td>.004</td>
<td>4.816</td>
<td>1.666-13.925</td>
</tr>
<tr>
<td>Cardiac diagnosis at ICU admission</td>
<td>-3.360</td>
<td>1.577</td>
<td>4.539</td>
<td>.03</td>
<td>0.035</td>
<td>0.002-0.764</td>
</tr>
</tbody>
</table>

Abbreviations: ICU, intensive care unit; MAP, mean arterial pressure.
Nagelkerke $R^2 = 0.571$; Hosmer and Lemeshow test: $\chi^2 = 5.3, df = 8; P = .73$. 

Addition of a second agent
IAD Assessment Tool

Hospital Survey on Incontinence & Related Skin Injury

Instructions:
This survey is limited to inpatient care areas and excludes the following:
Labor & Delivery, Obstetrics, Nursery, Emergency Department & Operating Room.
Note: Complete ONLY ONE form for each unit.

Date of Survey: __/__/_______  Unit: _______

Please check the unit specialty that best describes the care provided.

<table>
<thead>
<tr>
<th>Specialty</th>
<th>Areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burn</td>
<td>LTAC</td>
</tr>
<tr>
<td>Cardiac Surgery</td>
<td>LTC</td>
</tr>
<tr>
<td>CCU - General</td>
<td>Psychiatric - Geriatric</td>
</tr>
<tr>
<td>CCU - Intervention</td>
<td>Medical</td>
</tr>
<tr>
<td>ICU - Cardiovascular</td>
<td>Respiratory/Pulmonary</td>
</tr>
<tr>
<td>ICU - General</td>
<td>Neurology</td>
</tr>
<tr>
<td>ICU - Medical</td>
<td>Oncology</td>
</tr>
<tr>
<td>ICU - Neuro</td>
<td>Orthopedic</td>
</tr>
<tr>
<td>ICU - Neonatal</td>
<td>Surgical</td>
</tr>
<tr>
<td>ICU - Pediatric</td>
<td>Other</td>
</tr>
<tr>
<td>ICU - Surgical</td>
<td>Surgical</td>
</tr>
<tr>
<td>ICU - Psychiatric</td>
<td>LTAC</td>
</tr>
<tr>
<td>ICU - General</td>
<td>Telemetry - Pediatric</td>
</tr>
<tr>
<td>ICU - Surgical</td>
<td>Telerey - General</td>
</tr>
<tr>
<td>ICU - Surgical</td>
<td>Psychological - Geriatric</td>
</tr>
<tr>
<td>ICU - General</td>
<td>Wound Care</td>
</tr>
</tbody>
</table>

Patient Census of Unit at Time of Survey: ______

Incontinence Collection Products:
Check all that apply to a specific unit/work area.

<table>
<thead>
<tr>
<th>Item</th>
<th>Collection Device</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaper/Brief</td>
<td></td>
</tr>
<tr>
<td>Reusable cloth</td>
<td>Reusable cloth</td>
</tr>
<tr>
<td>Disposable plastic-backed</td>
<td>Disposable plastic-backed</td>
</tr>
<tr>
<td>Disposable air flow-backed</td>
<td>Disposable air flow-backed</td>
</tr>
</tbody>
</table>

Incontinence Cleanup & Skin Protection:
Check all product categories that are available in a specific unit/work area.

Cleansing:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Soap/Water/Basin</td>
<td></td>
</tr>
<tr>
<td>Peri-Wash (spray)</td>
<td></td>
</tr>
<tr>
<td>Cleansing Foam</td>
<td></td>
</tr>
<tr>
<td>Liquid Film Barrier</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

Moisturizers:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lotion</td>
<td></td>
</tr>
<tr>
<td>Cream</td>
<td></td>
</tr>
<tr>
<td>Ointment</td>
<td></td>
</tr>
</tbody>
</table>

Barrier Protection: (Tubes, Bottles or Sprays)

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Complications:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Section 2 - Complete only for Incontinent patients:

Incontinence Clean-up & Skin Protection:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Incontinence Assessment:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Postural/Environmental:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Demographics Information:

<table>
<thead>
<tr>
<th>Patient Information</th>
<th></th>
</tr>
</thead>
</table>

Patient Gender: ______

Patient Age Group: ______

Continence Status:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Section 3 - Complete only for Incontinent patients:

Contributing Factors & Co-Morbidities:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Section 4 - Complete only for Incontinent patients:

Patient Skin Injury:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Section 5 - Complete only for Incontinent patients with redness/irritation of buttock or perineum:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Section 6 - Complete only for Incontinent patients with redness/irritation of buttock or perineum:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Section 7 - Complete only for Incontinent patients with redness/irritation of buttock or perineum:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Patient Skin Injury:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Section 8 - Complete only for Incontinent patients with redness/irritation of buttock or perineum:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

Section 9 - Complete only for Incontinent patients with redness/irritation of buttock or perineum:

<table>
<thead>
<tr>
<th>Item</th>
<th>Use at Work Area</th>
</tr>
</thead>
</table>

“One’s mind, once stretched by a new idea, never regains its original dimensions.”

Oliver Wendell Holmes
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 boney prominences
    - Between pillows and wedges, the wedge system was more effective in reducing pressure in the sacral area (healthy subjects) (Bush T, et al. WOCN, 2015;42(4):338-345)
  - 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

Prophylactic Dressings: Emerging Therapies

- Consider applying a polyurethane foam dressing to bony prominences in the areas frequently subjected to friction and share (B)
- Consider placement prior to prolonged procedures or continuous head elevation (B)
- Consider ease of application and removal and the ability to reassess the skin.
- Continue to use all of other preventative measures necessary when using prophylactic dressings (C)

Systematic Review: Use of Prophylactic Dressing in Pressure Injury Prevention

- 21 studies met the criteria for review
- 2 RCTs, 9 had a comparator arm, five 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

- 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
  - Breathable slide stay in bed glide sheet
  - Do not leave moving and handling equip underneath the patient

Current Practice: Turn & Reposition

Specialty Bed  Disposable Slide Sheets

Draw Sheet/Pillows/Layers of Linen  Lift Device

Breathable Glide Sheet
Achieving the Use of the Evidence For Pressure injury Reduction

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

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

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

<table>
<thead>
<tr>
<th>Demographic Comparison</th>
<th>SOC</th>
<th>PPS</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean time on product (range), d</td>
<td>7 (1-29)</td>
<td>7 (1-45)</td>
<td>1.00</td>
</tr>
<tr>
<td>Mean age (SD) (range), y</td>
<td>57.72 (18.45) (18-89)</td>
<td>57.73 (17.67) (23-92)</td>
<td>1.00</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>14</td>
<td>10</td>
<td>.43</td>
</tr>
<tr>
<td>Male</td>
<td>16</td>
<td>19</td>
<td></td>
</tr>
<tr>
<td>Braden Scale score</td>
<td>12.77</td>
<td>13.23</td>
<td>.46</td>
</tr>
<tr>
<td>Mobility</td>
<td>0-1</td>
<td>0-1</td>
<td>1.00</td>
</tr>
<tr>
<td>BMI</td>
<td>29.62</td>
<td>30.97</td>
<td>.65</td>
</tr>
</tbody>
</table>
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)

<table>
<thead>
<tr>
<th></th>
<th>SOC</th>
<th>PPS</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>PU development</td>
<td>6</td>
<td>1 a</td>
<td>.04</td>
</tr>
<tr>
<td># of times patients pulled up in bed</td>
<td>3.28</td>
<td>2.58</td>
<td>.03</td>
</tr>
<tr>
<td># of staff required to turn patient</td>
<td>1.97</td>
<td>1.35</td>
<td>&lt;.0001</td>
</tr>
</tbody>
</table>

1a PU development with 24hrs of admission

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
• 3660 patients
• Compared HAPI rates, patient handling injuries and cost

Way H, Am JSPHM, 2016;6(4):160-165
EBP Recommendations to Achieve Offloading & Reduce Pressure

• Turn & reposition every 2 hours (avoid positioning patients on a pressure ulcer)
  – Use active support surfaces for patients at higher risk of development where frequent manual manual turning may be difficult
  – Microclimate management
  – Heel protection
  – Early Mobility programs
  – Seated support surfaces for patients with limited mobility when sitting in a chair

Evidence Based Strategies for Safe Patient Handling

OhioHealth

The adoption of a new device for turning, boosting and lateral transfer in critically ill patients

Susan L. Salsbury OTR/L, CDM5, Occupational Therapist, System Lead for Safe Patient Handling and Mobility, OhioHealth, Columbus, OH
Beth Kaper, BSN RN TNCC, Safe Patient Handling and Mobility Co-Lead, OhioHealth Riverside
Justin L Martin, MPT, Physical Therapist, Safe Patient Handling and Mobility Lead, OhioHealth Mansfield and Shelby

BACKGROUND
Over the past decade increasingly more focus is being placed on worker injury and safe patient handling in acute care settings. As a result, ceiling lifts have become more widely implemented in hospitals. While data support that the use of these devices is safe for patients and can reduce staff injury, numerous studies have reported a lack of compliance among health care workers in using ceiling lifts for all patient handling. This can be referred to as a lack of full adoption. Research to date supports that most health care workers are only partial adopters of ceiling lift devices.

PURPOSE
To measure the proportion of full adopters to partial adopters with the use of a new device for turning, boosting in bed, and lateral patient transfer. The device uses a low friction surface and air-assisted technology to decrease staff exertion repositioning moving patients. While the device can be used without the air, the full benefits for reduced healthcare worker exertion are realized when the blower is turned on.

METHODS
The new patient repositioning device was implemented in two intensive care units and used for turning, boosting in bed, and lateral patient transfer.

RESULTS
Staff were surveyed on the frequency of blower use while repositioning patients in bed. The percent of full adopters was 93% (39/42) and the percent of partial adopters was 7% (3/42). Overall ease of use as compared to standard practice was rated highly at 4.68 out of 5.

CONCLUSIONS
Critical care nurses are required to reposition patients in bed as often as 6-10 times per shift. Repositioning is a frequent repetitive activity that requires high exertion, awkward posture, and can lead to staff injury over time. Compliance with the intended use of this device was high as the vast majority of staff were full adopters, likely reducing the staff risk for injury.

Salsbury S. Presented at AACN’s National Teaching Institute, May 16th-19th, 2016. New Orleans, LA.
Evidence Based Strategies for Safe Patient Handling

Evaluation of a new procedure for boosting critically ill patients in bed

Susan L. Salsbury OTR/L, CDMS, Occupational Therapist, OhioHealth, Columbus, OH • Beth Kager, BSN RN TNCC, Safe Patient Handling and Mobility Co-Chair, OhioHealth Riverside
Justin L. Martin, MPT, Physical Therapist, Safe Patient Handling and Mobility Lead at OhioHealth Mansfield and Shelby

**BACKGROUND**

Patient handling is widely recognized as a contributing factor to musculoskeletal injuries for critical care nurses. Patient handling injuries originate from repeated microscopic trauma due to high exertion, awkward posture, and frequent activities over extended periods of time without enough rest. Critical care nurses are required to boost physically dependent patients in bed as often as 6-10 times per shift. Boosting is a frequent repetitive activity that requires high exertion and awkward posture.

**RESULTS**

Forty-two nurses completed the survey. Device satisfaction was Very Good to Excellent.

- average ease of boosting = 4.81
- average ease of performing lateral transfers = 4.79
- product comparison to current practice for boosting/in-bed mobility = 4.78
- patient comfort = 4.54
- ease of integrating product into clinical workflow = 4.79
- impact on improving clinician safety = 4.86

Narrative comments included:

"With this procedure, a 100 pound nurse can boost a 300 pound patient; less strain on my back; used down in CT and it was fabulous."

**METHOD**

The purpose of this product evaluation was to appraise the effectiveness of a new airflow assist device used to boost patients in bed. Critical care nurses rated their perceptions regarding ease of boost, ease of lateral transfer compared to current practice, patient comfort, clinical workflow, and clinician safety using a 5-point Likert scale (1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, and 5 = Excellent).

**CONCLUSIONS**

Critical care nurses rated the boosting device favorably in all categories. Nurses perceive the device easier to use for boosting patients in bed, which may be associated with less back strain.

**SIGNIFICANCE**

Patient handling injury is a significant safety issue for critical care nurses whose patients require assistance with even basic movements. Further evaluation is recommended to evaluate efficacy with interprofessional groups and varied clinical populations.

Salsbury S. Presented at AACN’s National Teaching Institute, May 16th-19th, 2016. New Orleans, LA.
Turn Clock
In-Bed Technology
EBP Recommendations to Achieve Offloading & Reduce Pressure

- Ensure the heels are free of the bed surface
  - Heal-protection devices should elevate the heel completely (off-load) in such a way as to distribute weight along the calf
  - The knee would be in slight flexion
  - Remove device periodically to assess the skin

Heel Protectors

Heel Pads

Miller SK, et al WOCN, 2015;42(4):346-351
Successful Intervention for the Reduction of Heel Ulcers and Plantar Contracture in the High Risk Ventilated Patients

Study Inclusion Criteria

- Sedated patient > 5 days
- May or may not be intubated
- Braden equal to or less than 16

Procedure

- Skin assessment and Braden completed on admission
- All pts who met criteria were measured for ROM of the ankle with goniometer, then every other day until pt did not meet criteria
- Heel appearance, Braden and Ramsey scores were assessed every other day and documented
- Identified and trained ICU nurses completed the assessments

Results

Sustainability of Heel Injury Reduction: QI Project

- 490 bed facility
- Evidence-based quality improvement initiative
- 4 tier Process
  - Partnership
  - Comprehensive product review
  - Education & engagement
  - Support structures & processes

Hanna-Bull D. WOCN, 2016;43(2):129-132

Heel Injury Reduction

- Pre-Implementation: 5.8%
- 1 year: 4.2%
- 4 years: 1.6%

72% Reduction
EBP Recommendations to Achieve Offloading & Reduce Pressure

- Turn & reposition every 2 hours (avoid positioning patients on a pressure ulcer)
  - Use active support surfaces for patients at higher risk of development where frequent manual manual turning may be difficult
  - Microclimate management
  - Early Mobility programs
  - Seated support surfaces for patients with limited mobility when sitting in a chair

Transition: In-Bed to Out of Bed & Back
Out of Bed Mobilization Strategies
Current Seating Positioning Challenges

- **Uncomfortable**

- Airway & Epiglottis compressed
- Body Alignment
- Shear/Friction
- Sacral Pressure

- Frequent repositioning & potential caregiver injury
- Potential risk of sliding from chair

Sacral Sitting
Repositioning Patients in Chairs: An Improved Method (SPS)

- Study physical exertion required for 3 methods of repositioning patients in chairs
- 31 caregiver volunteers
- Each caregiver trialed all 3 repositioning 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

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

Will Rogers
Prevention Strategies for IAD
Evidence-Based Components of an IAD Prevention Program

• Skin care products used for prevention or treatment of IAD should be selected based on consideration of individual ingredients in addition to consideration of broad product categories such as cleanser, moisturizer, or skin protectant. (Grade C)
  – A skin protectant or disposable cloth that combines a pH balanced no rinse cleanser, emollient-based moisturizer, and skin protectant is recommended for prevention of IAD in persons with urinary or fecal incontinence and for treatment of IAD, especially when the skin is denuded. (Grade B)
  – Commercially available skin protectants vary in their ability to protect the skin from irritants, prevent maceration, and maintain skin health. More research is needed (Grade B)

EBP Recommendations to Reduce Injury From Incontinence & Other Forms of Moisture

- Clean the skin as soon as it becomes soiled
- Use an incontinence pad and/or briefs that wick away
- Use a protective cream or ointment
  - Disposable barrier cloth recommended by IHI & IAD consensus group
- Ensure an appropriate microclimate & breathability
- < 4 layers of linen
- Barrier & wick away material under adipose and breast tissue
- Support or retraction of the adipose tissue (i.e. KanguruWeb)
- Pouching device or a bowel management system

Current Practice: Moisture Management

Reusable Incontinence Pads

Disposable Incontinence Pads

Adult Diaper

Airflow pads for Specialty Beds
EBP Recommendations to Reduce Injury From Incontinence & Other Forms of Moisture

- Clean the skin as soon as it becomes soiled
- Use an incontinence pad and/or briefs that wick away
- Use a protective cream or ointment
  - Disposable barrier cloth recommended by IHI & IAD consensus group
- Ensure an appropriate microclimate & breathability
- < 4 layers of linen
- Barrier & wick away material under adipose and breast tissue
- Support or retraction of the adipose tissue (i.e. KanguruWeb)
- Pouching device or a bowel management system

IAD/HAPU Reduction Study

- Prospective, descriptive study
- 2 Neuro units
- Phase 1: prevalence of incontinence & incidence of IAD & HAPU
- Phase 2: Intervention
  - Use of a 1 step cleanser/barrier product
  - Education on IAD/HAPU
- Results:
  - Phase 1: incontinent 42.5%, IAD 29.4%, HAPU 29.4%, LOS 7.3 (2-14 days), Braden 14.4
  - Phase 2: incontinent 54.3%, IAD & HAPU 0, LOS 7.4 (2-14), Braden 12.74

EBP Recommendations to Reduce Injury From Incontinence & Other Forms of Moisture

- Clean the skin as soon as it becomes soiled
- Use an incontinence pad and/or briefs that wick away
- Use a protective cream or ointment
  - Disposable barrier cloth recommended by IHI & IAD consensus group
- Ensure an appropriate microclimate & breathability
- < 4 layers of linen
- Barrier & wick away material under adipose and breast tissue
- Support or retraction of the adipose tissue (i.e. KanguruWeb)
- Pouching device/bowel management system/male external urinary device

www.ihi.org
Doughty, D, et al. JWOCN. 2012;39(3):303-315
Ambulation Assist Devices
Medical Device Related Pressure Ulcers

- Prospective descriptive study to determine, prevalence, risk factors and characteristics of MDR’s PI
- 175 adults in 5 ICU’s
- 27 developed non-device related HAPI (15.4%)
- 70 developed MDR’s HAPI (45%)
- 42% were stage 2

### Table 3. Type of attached medical devices and rate of MDR HAPUs

<table>
<thead>
<tr>
<th>Medical devices rate (n=175 patients)</th>
<th>Ulcer rate by medical device type (n=211 devices)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Monitoring</strong></td>
<td></td>
</tr>
<tr>
<td>ECG leads</td>
<td>173 98.8</td>
</tr>
<tr>
<td>ECG electrodes</td>
<td>172 98.2</td>
</tr>
<tr>
<td>BP cuff</td>
<td>171 97.7</td>
</tr>
<tr>
<td>SpO2 probe</td>
<td>170 97.1</td>
</tr>
<tr>
<td><strong>GI/GU</strong></td>
<td></td>
</tr>
<tr>
<td>Nasogastric</td>
<td>43 24.5</td>
</tr>
<tr>
<td>Orogastric</td>
<td>15 8.5</td>
</tr>
<tr>
<td>PEG</td>
<td>1 0.5</td>
</tr>
<tr>
<td>Foley</td>
<td>162 92.5</td>
</tr>
<tr>
<td><strong>Vascular lines</strong></td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>72 41.1</td>
</tr>
<tr>
<td>Arterial</td>
<td>118 67.4</td>
</tr>
<tr>
<td>Peripheral</td>
<td>89 50.8</td>
</tr>
<tr>
<td><strong>Respiratory</strong></td>
<td></td>
</tr>
<tr>
<td>ET tube</td>
<td>67 38.2</td>
</tr>
<tr>
<td>Nasal cannula</td>
<td>54 30.8</td>
</tr>
<tr>
<td>CPAP mask</td>
<td>20 11.4</td>
</tr>
<tr>
<td>Oxygen mask</td>
<td>40 22.8</td>
</tr>
<tr>
<td><strong>Preventive devices</strong></td>
<td></td>
</tr>
<tr>
<td>TED</td>
<td>38 21.7</td>
</tr>
<tr>
<td>Cervical collar</td>
<td>4 2.2</td>
</tr>
<tr>
<td>Splint</td>
<td>2 1.1</td>
</tr>
<tr>
<td>Other devices*</td>
<td>18 10.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>211 100.0</td>
</tr>
</tbody>
</table>

MDR HAPU = medical device-related hospital-acquired pressure ulcer; BP = blood pressure; CPAP = continuous positive airway pressure; ECG = electrocardiograph; ET = endotracheal; GI/GU = gastrointestinal/gerito-urinary; PEG = percutaneous endoscopic gastrostomy; SpO2 = peripheral oxygen saturation of hemoglobin; TEDs = thrombo-embolism deterrent.

* n>175 due to >1 medical device per patient; * n > 211 due to >1 MDR PU per device; ** Airway, endotracheal tube holder, and plaster
Medical Device Related Pressure Ulcers

National incidence estimated 25%-29%
Minnesota Hospital Association/http://www.mnhospitals.org/pressure-ulcers

Figure 1. Distribution (percentage) of MDR PU’s by stage (n=211).

Figure 2. Distribution (percentage) of MDR PU’s by anatomical location (n=211).

Table 4. Odds ratios of MDR HAPU risk factors (n=564)

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>P</th>
<th>OR</th>
<th>95% CI for OR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced age</td>
<td>.095</td>
<td>1.023</td>
<td>.996</td>
</tr>
<tr>
<td>Enteral feeding</td>
<td>.045b</td>
<td>2.12</td>
<td>.785</td>
</tr>
<tr>
<td>With traditional HAPUs</td>
<td>.001b</td>
<td>6.600</td>
<td>1.210</td>
</tr>
<tr>
<td>Medical ICU</td>
<td>.001b</td>
<td>7.041</td>
<td>2.144</td>
</tr>
<tr>
<td>Neurosurgical ICU</td>
<td>.011b</td>
<td>6.221</td>
<td>1.520</td>
</tr>
<tr>
<td>Chest diseases ICU</td>
<td>.009b</td>
<td>6.014</td>
<td>1.557</td>
</tr>
<tr>
<td>Anesthesia-Resuscitation ICU</td>
<td>.078</td>
<td>3.478</td>
<td>.870</td>
</tr>
<tr>
<td>High risk Braden Scale score</td>
<td>.040b</td>
<td>1.815</td>
<td>1.029</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>.147</td>
<td>2.075</td>
<td>.773</td>
</tr>
<tr>
<td>Use of steroids</td>
<td>.649</td>
<td>.806</td>
<td>.318</td>
</tr>
<tr>
<td>Use of anticoagulants</td>
<td>.138</td>
<td>2.079</td>
<td>.791</td>
</tr>
<tr>
<td>Use of sedatives</td>
<td>.088</td>
<td>2.565</td>
<td>.868</td>
</tr>
<tr>
<td>Low albumin g/dl</td>
<td>.056</td>
<td>.527</td>
<td>.280</td>
</tr>
<tr>
<td>Low hemoglobin g/dl</td>
<td>.104</td>
<td>1.170</td>
<td>.968</td>
</tr>
</tbody>
</table>

HAPUs = hospital-acquired pressure ulcers; ICU = intensive care units; MDR PU = medical-device related pressure ulcers; CI = confidence interval; OR = odds ratio
*mean age 67.4±6.1; bP < 0.05; amean albumin 2.8±0.7; amean hemoglobin 9.7±1.7
Having a medical device you are 2.4 x more likely to develop a HAPU of any kind (p=0.0008)

Prevention of MDR’s-HAPI

Best Practices for Prevention of Medical Device-Related Pressure Ulcers in Critical Care

- Choose the correct size of medical device(s) to fit the individual
- Cushion and protect the skin with dressings in high-risk areas (e.g., nasal bridge)
- Inspect the skin in contact with device at least daily (if not medically contraindicated)
- Avoid placement of device(s) over sites of prior or existing pressure ulcer
- Educate staff on correct use of devices and prevention of skin breakdown
- Be aware of edema under device(s) and potential for skin breakdown
- Confirm that devices are not placed directly under an individual who is bedridden or immobile

Haugen V, Perspectives; 2016 http://www.perspectivesinnursing.org/current.html
Progressive Mobility + Care Giver Safety + Skin Safety
Fall Prevention:
Critical Part of the Circle of Safety
The Joint Commission Center for Transforming Healthcare Preventing Patient Falls Project

- 7 U.S. Hospitals
- Report describes risks for falls, root causes for those risks and solutions
- Results 62% reduction in falls with injury and 35% reduction in falls rate
- Keys for success
  - Measure and analyze contributing factors
  - Address culture change

Health Research & Educational Trust. (2016, October)
Top Factors/Issues that Contribute to Patient Falls

- Fall risk assessment
- Handoff communication
- Toileting
- Call light
- Education and organizational culture
- Medication

Health Research & Education Trust, (2016, October)
Summary: Best Practices for Falls Prevention

- Complex and multifactorial: NO MAGIC BULLET
- Organizational support for falls reduction across departments and disciplines
- Transparency of fall rates
- Accountability through auditing compliance with fall risk assessments and interventions

(Degelau, et al., 2012)
Summary: Best Practices for Falls Prevention

- Fall risk assessment (many different instruments)
- Visual identification of patients at high risk for falls
- Falls risk factor directed interventions
  - Early progressive mobility
  - Safe handling practices during ADL’s & mobility (need a reference)
- Standardized multifactorial education with visual tools for staff, family and patients
- Teach back with patient education
- Interdisciplinary collaboration

(Degelau, et al., 2012)
Early Mobility:
Can We Do It?
Is it Safe?
Safety

• > 1% adverse events during 1449 sitting, standing and walking sessions with patients on ventilators.

• Impact of safety of therapy intervention in a single center (routine care) between 2009-2011
  – 1787 admission of at least 24hrs
  – 1110 participated in 5267 PT sessions (1-3 days from admission)
  – 10 different therapist on 4580 days

• Results:
  – Physiological abnormalities: 34 session (0.6%)
    – Arrhythmias: 10 occurrences (0.2%)
    – MAP > 140: 8 occurrences (0.2%)
    – MAP < 55: 5 occurrences (0.1%)
    – Oxygen desaturation: 4 occurrences (0.8%)
    – Falls: 3 occurrences (0.6%)
    – 1 chest tube, feeding tube and arterial line

Sricharoenchai T, et al. J of Crit Care, 2104;29:395-400
Challenges to Mobilizing Patients

- Patient-related barriers (50%)
  - Hemodynamic instability, ICU devices, physical & neuropsychological

- Structural (18%)
  - Human or Technological Resources

- ICU culture (18%)
  - Knowledge/Priority/Habits

- Process related (14%)
  - Service delivery/lack of coordination
  - Clinician function

Potentially Modifiable Barriers

## Decision-Making Tree for Patients Who Are Hemodynamically Unstable With Movement¹,²

<table>
<thead>
<tr>
<th>Screen for mobility readiness within 8 hrs of admission to ICU &amp; daily initiate in-bed mobility strategies as soon as possible</th>
<th>Is the patient hemodynamically unstable with manual turning?</th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>Begin in-bed mobility techniques and progress out-of-bed mobility as the patient tolerates</td>
</tr>
<tr>
<td>Yes</td>
<td>Begin in-bed mobility techniques and progress out-of-bed mobility as the patient tolerates</td>
</tr>
<tr>
<td></td>
<td>Is the patient still hemodynamically unstable after allowing 5-10 minutes’ adaption post-position change before determining tolerance?</td>
</tr>
<tr>
<td>No</td>
<td>Allow the patient a minimum of 10 minutes of rest between activities, then try again to determine tolerance</td>
</tr>
<tr>
<td>Yes</td>
<td>Try the position turn or HOB maneuver slowly to allow adaptation of cardiovascular response to the inner ear position change</td>
</tr>
<tr>
<td></td>
<td>Screen for mobility readiness within 8 hrs of admission to ICU &amp; daily initiate in-bed mobility strategies as soon as possible</td>
</tr>
<tr>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Has the manual position turn or HOB elevation been performed slowly?</td>
<td>Initiate continuous lateral rotation therapy via a protocol to train the patient to tolerate turning</td>
</tr>
</tbody>
</table>

HOB=head of bed; HR=heart rate; MAP=mean arterial pressure; SPB=systolic blood pressure.
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. Patient’s with unstable pelvis 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.

WHEN WOULD NOW BE A GOOD TIME TO DO THIS?

It is not enough to do your best, you have to know what to do and then do your best.

E Deming
How Do We Make It Happen?
Driving Change

• Gap analysis
• Build the Will
• Protocol Development

• Make it Prescriptive
• Overcoming barriers
• Daily Integration

Structure + Process → Outcomes

Protocol Development
The Goal: Patient & Caregiver Safety

- Leadership
  - Patient Progressive Mobility
  - Safe Patient Handling
  - Falls
  - Reduce Risk of Pressure Injuries

↓ Hospital LOS
↓ ICU LOS
↓ Skin Injury
↓ CAUTI
↓ Delirium
↓ Time on the vent

↓ 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

↓ Falls
↓ Falls with injury
↓ Hospital LOS
Action Plan

• Gather frontline clinicians, manager, skin nurse/WOCN, safe patient handling people to create a team

• Gather baseline clinical & financial data on;
  – Perceive exertion with current in-bed and out of bed mobility activities
  – Unit worker injury rates
  – Pressure injury rates

• Present data and proposal to leadership
Be Courageous

We all are responsible for the safety of our patients & ourselves…Own the Issues

• “If not this, then what??”
• “If not now, then when?”
• “If not me, then who??”
Contact Kathleen Vollman at
kvollman@comcast.net
www.Vollman.com