Intact Skin is In: Bundling Evidence Based Strategies to Reduce Hospital Acquired Skin Injury while Protecting the Caregiver

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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, Sepsis, 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 the new strategies to determine patients at risk for injury
- Outline evidence-based prevention strategies for incontinence associated dermatitis, friction reduction and pressure injury prevention
- Describe key care process changes that lead to a successful reduction of skin injury and prevent healthcare worker injury

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 patients host defense through proactive use of evidence based hygiene care strategies

Incontinence Associated Dermatitis Prevention Program
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

Add ANA-
The Goal: Patient & Caregiver Safety

- Safe Patient Handling
- Prevention of Pressure Injuries
- Falls
- Patient Progressive Mobility

How Well Are We Doing?
Early Progressive Mobility

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

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, 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
Pressure Injury

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

Reddy, M.et.al. JAMA, 2006; 296(8):974-984
National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure
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 from 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

- 5342 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 at a Wound Care Conference, 2016, New York City, NY

Pressure ulcer incidence rate
(n=# of pts. w/ a PU that developed after admit, includes stage II-IV & unstageable PU using NPUAP staging definitions, does not include stage I or suspected deep tissue injuries)

Rate of pressure ulcers among Minnesota HIIN hospitals
86 of 122 hospitals reporting a 15% increase

\[ y = -0.0004x + 0.364 \]
Pressure Ulcer PSI-03
(n= pts with secondary ICD9/10 codes for PU stages II, IV, or unstageable)

O/E Pressure ulcers from PSI-03
113 of 115 HIIN hospitals reporting a 30% decrease

y = -0.0231x + 0.4742

First Qtr of hospitals using ICD-10 Coding

Adverse Health Events Year 13

ADVERSE HEALTH EVENTS IN MINNESOTA
Pressure ulcer site

Device Related Pressure Ulcers

<table>
<thead>
<tr>
<th>Year</th>
<th>Device Related</th>
</tr>
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<tbody>
<tr>
<td>Year 10</td>
<td>24 (25%)</td>
</tr>
<tr>
<td>Year 11</td>
<td>42 (39%)</td>
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<tr>
<td>Year 12</td>
<td>39 (38%)</td>
</tr>
<tr>
<td>Year 13</td>
<td>53 (41%)</td>
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</table>
Caregiver Harm

Oh, My Aching Back!

Back Pain Incidence in Nursing:
- 8 out of 10 nurses work despite experiencing musculoskeletal pain
- 62% of nurses report concern developing a disabling musculoskeletal injury
- 56% of nurses report musculoskeletal pain is made worse by their job
- Nursing assistants had the 2nd highest and RNs had the 6th highest number of musculoskeletal disorders in the U.S.

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)
What About Staff Harm?

- 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.)


Number, Incidence Rate, & Median Days Away From Work for Occupational Injuries RN’s with Musculoskeletal Disorders in US, 2003-2004

<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>
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<tr>
<td>2003</td>
<td>private industry</td>
<td>RNs</td>
<td>10,050</td>
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<td>6</td>
</tr>
</tbody>
</table>

Patient Falls

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)
### Driving Change

- **Structure**
  - Gap analysis
  - Build the Will
  - Protocol Development

- **Process**
  - Make it Prescriptive
  - Overcoming barriers
  - Daily Integration

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### 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
Gap Analysis of Prevention Strategies

- Assessment of Risk
- Pressure Injury/Turn/Shear reduction
- Health Care Worker Safety
- Early Mobility
- Device Related Injuries
- Managing Incontinence & Other Moisture
- Hemodynamic Instability

Identify Patients at High Risk
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 (Mobility, sensory perception, activity)
  - Pressure on tissues (Mobility, sensory perception, activity)
  - Score 6-23

Clinical judgment of nurses alone achieve inadequate capacity to assess PU risk
Extremely obese patient 2x more likely to develop a PU*


It's 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)

Braden Score Braden Sub-Scales

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)

IAD Assessment Tool

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

Oliver Wendell Holmes

The Goal: Patient & Caregiver Safety

- Patient Progressive Mobility
- Safe Patient Handling
- Prevention of Pressure Injuries
- Falls

Leadership
Pressure & Shear as a Risk Factor

Sacrum & Heels

EBP Recommendations to Achieve Offloading & Reduce Pressure (A)

• Turn & reposition every (2) hours (avoid positioning patients on a pressure ulcer)
  – 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

  • Reger SI et al. JWM, 2007;53(10):50-58; www.ihi.org
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


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

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
Breathable Glide Sheet
Draw Sheet/Pillows/Layers of Linen
Lift Device
Achieving the Use of the Evidence For Pressure Ulcer 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>
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<th>Demographic Comparison</th>
<th>SOC</th>
<th>PPS</th>
<th>P</th>
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<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>1²</td>
<td>.04</td>
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<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>

¹ PU development with 24hrs of admission

Impact of a Turn & Position Device on PI & Staff Time

• Prospective, QI study (1 SICU & 1MICU)
• 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

**PATIENT HANDLING INJURY AND COSTS**

<table>
<thead>
<tr>
<th>Injuries/Cost</th>
<th>January 2012 to October 2012 (Before)</th>
<th>November 2012 to August 2013 (After)</th>
<th>November 2013 to August 2014 (After)</th>
<th>November 2014 to August 2015 (After)</th>
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</thead>
<tbody>
<tr>
<td>Injuries</td>
<td>19/8427,500</td>
<td>8/8180,000</td>
<td>2/845,000</td>
<td>5/5112,500</td>
</tr>
<tr>
<td>Cost</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

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

**BACKGROUND**
Patient handling is widely recognized as a multidisciplinary issue in healthcare facilities. Patient handling injuries result from repeated movements required due to high-moment, high-position patient-handling activities. In one study, nurses were responsible for physically damaging patients in bed as often as 20% of their work shift. Repeating is frequent movement activity that requires high moment and awkward postures.

**RESULTS**
- Average time to handling: 4.81
- Patient comfort: 4.79
- Patient safety: 4.78
- Patient satisfaction: 4.56
- Staff satisfaction: 4.79
- Impact on improving patient workflow: 4.86

**CONCLUSION**
Critical care nurses need to balance patient handling workflow to prevent harm to the patient and prevent injuries to the patient handling team. A new procedure has been developed which can be used to handle critically ill patients safely and efficiently.

Salsbury S. Presented at AACN’s National Teaching Institute, May 16th-19th, 2016. New Orleans, LA.

In-Bed Technology

10
LEFT
12
RIGHT
2
LEFT
8
RIGHT
4

Patient handling pain is a significant safety issue for critically ill patients. A new technology allows patients to receive continuous pain relief and active interventions. Further validation is recommended to evaluate efficacy with morphine-resistant pain and non-clinical populations.
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 Prevention 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

Study Inclusion Criteria
53 sedated patients over a 7 month period

Procedure


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

Heel Injury Reduction

Hanna-Bull D. WOCN, 2016;43(2):129-132
EBP Recommendations to Achieve Offloading & Reduce Pressure

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Transition: In-Bed to Out of Bed & Back
Out of Bed Technology

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
Repositioning Patients in Chairs: An Improved Method (SPS)

- Study the exertion required for 3 methods of repositioning patients in chairs
- 31 care giver volunteers
- Each one trial of all 3 reposition methods
- Reported perceived exertion using the Borg tool, a validated scale.

Method 1: 2 care givers 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


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 balance 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 recommend 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
- Adult diaper
- Disposable Incontinence Pads
- Airflow pads for Specialty Beds

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References:
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 recommend 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

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

HanonuS & Karadag A. OWN, 2016;62(2):12-22

Medical Device Related Pressure Ulcers

**Table 4: Odds ratios of MDR HAPU risk factors (n=554)**

<table>
<thead>
<tr>
<th>Risk factors</th>
<th>P</th>
<th>OR</th>
<th>Lower 95% CI</th>
<th>Upper 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advanced age*</td>
<td>.096</td>
<td>1.023</td>
<td>.996</td>
<td>1.050</td>
</tr>
<tr>
<td>Parenteral feeding</td>
<td>.045</td>
<td>2.12</td>
<td>.785</td>
<td>3.125</td>
</tr>
<tr>
<td>With traditional HAPUs</td>
<td>.003</td>
<td>6.600</td>
<td>1.210</td>
<td>15.180</td>
</tr>
<tr>
<td>Medical ICU</td>
<td>.001</td>
<td>7.041</td>
<td>2.144</td>
<td>23.269</td>
</tr>
<tr>
<td>Neurosurgical ICU</td>
<td>.011</td>
<td>6.221</td>
<td>1.520</td>
<td>25.454</td>
</tr>
<tr>
<td>Chest diseases ICU</td>
<td>.009</td>
<td>6.014</td>
<td>1.557</td>
<td>23.228</td>
</tr>
<tr>
<td>Anesthesiology &amp; Resuscitation ICU</td>
<td>.078</td>
<td>3.478</td>
<td>.870</td>
<td>13.888</td>
</tr>
<tr>
<td>High risk Braden Scale score</td>
<td>.040</td>
<td>1.815</td>
<td>1.029</td>
<td>3.259</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>.147</td>
<td>2.075</td>
<td>.773</td>
<td>5.586</td>
</tr>
<tr>
<td>Use of steroids</td>
<td>.649</td>
<td>.806</td>
<td>.318</td>
<td>2.042</td>
</tr>
<tr>
<td>Use of anticoagulants</td>
<td>.138</td>
<td>2.079</td>
<td>.791</td>
<td>5.486</td>
</tr>
<tr>
<td>Use of sedatives</td>
<td>.088</td>
<td>2.585</td>
<td>.880</td>
<td>7.578</td>
</tr>
<tr>
<td>Low albumin g/dL</td>
<td>.056</td>
<td>.527</td>
<td>.280</td>
<td>.990</td>
</tr>
<tr>
<td>Low hemoglobin g/dL</td>
<td>.014</td>
<td>1.175</td>
<td>.980</td>
<td>1.413</td>
</tr>
</tbody>
</table>

| HAPUs = hospital-acquired pressure ulcers; ICU = intensive care unit; MDR = medical device related pressure ulcer. Co = confidence interval; OR = odds ratio; *mean age 66.4±9.4; IF = C+IF; Hb = mean hemoglobin.  

National incidence estimated 25%-29%

Minnnesota Hospital Association: http://www.mnhospitals.org/pressure-ulcers


HanonuS & Karadag A. OWN, 2016;62(2):12-22
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

Haugen V, Perspectives; 2016 http://www.perspectivesinnursing.org/current.html
Any Work on Skin Should Be Incorporated into a Progressive Mobility Protocol

Outcomes of Early Mobility Program

- ↓ incidence of skin injury
- ↓ time on the ventilator
- ↓ incidence of VAP
- ↓ days of sedation
- ↓ delirium
- ↑ ambulatory distance
- Improved function

Thomsen GE, et al. CCM 2008;36;1119-1124
Winkelman C et al, CCN,2010;30:36-56
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 turning may be difficult
  – Microclimate management
  – Early Mobility programs
  – Safe handling for out of bed & chair positioning

Challenges to Mobilizing Critically Ill 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

Hemodynamic Instability

Is it a Barrier to Positioning?

Effects of Immobility on Cardiovascular Function

Fluid shift
Occurs when the body goes from upright to supine position\(^1,2\)
10% of total blood volume is shifted from lower extremities to the rest of the body; 78% of this is taken up in the thorax\(^3,4\)
Decreased blood volume (~15% of plasma volume is lost after 4 weeks of bed rest)\(^2\)

Cardiac effects
Increased resting heart rate (an increase of ~10 beats/min is observed after 4 weeks of bed rest)\(^1,2\)
Cardiac deconditioning\(^2\)

Orthostatic intolerance
Increased in bedridden patients due to decreased baroreceptor sensitivity, reduced blood volume, cardiac deconditioning, decreased venous return and stroke volume, and venous distensibility\(^1,2\)


Overcoming Intolerance

- Slowing the turn
- Training to turn
**Methodology**

- Prospective randomized controlled trial, 3 medical ICUs at a single center
- Eligible if ventilated <48 hours and free from pneumonia, ALI, or in ARDS
- 150 patients with 75 in each group
- 35 patients with CLRT allocated to undergo percussion before suctioning
- Measures to prevent VAP were standardized for both groups including head of bed

**Results:** CLRT vs control

- VAP: 11% vs 23%, P=0.048
- Ventilation duration: 8 ± 5 days vs 14 ± 23 days, P=0.02
- LOS: 25 ± 22 vs 39 ± 45 days, P=0.01
- Mortality: no difference

ALI=acute lung injury; ARDS=acute respiratory distress syndrome; CLRT=continuous lateral rotation therapy; VAP=ventilator-associated pneumonia.

Introducing CLRT Into Patient Care

- Introduction of CLRT into patient care can provide an efficient way of providing early mobility to those critically ill patients whose condition or instability prevents implementation of other forms of mobility\(^1,2\)

**Systematic method of approaching placement and removal of CLRT therapy... a protocol**

---

Moving Those Who Cannot Move Themselves: Which Patients Should Receive CLRT?

- **Target high-risk patient populations**
  - Pulmonary-hemodynamic instability with manual turning
  - FiO\(_2\) 50% or more
  - Positive end-expiratory pressure (PEEP) 8 or more
  - Existing pulmonary complications
  - FiO\(_2\) increases by 20% (20 points) or PEEP >3 cm H\(_2\)O from baseline within 2 calendar days

- **Which patients should NOT receive CLRT?**
  - Those with unstable spines
  - Those with long bone fractures or patients requiring traction
  - Those with unstable intracranial pressure
  - Marked agitation without therapeutic management
  - Those with severe, uncontrolled diarrhea and patients that weigh more than 300 lbs
Ongoing Monitoring/Evaluation and Documentation

- Assess for potential complications frequently
  - Malposition of endotracheal tube
  - Positional transient desaturation
  - Positional hemodynamic instability
- Every 2 hours check to see if patient is in optimal position to promote effective turn
- Every 2 hours manually turn patient and evaluate skin and lungs, then resume rotational therapy
- Document in medical record: degree of rotation, pause time settings, hours of rotation, turn for skin check and lung evaluation every 2 hours
- Discontinue CLRT when the patient:
  - May be mobilized safely using other means (head of bed, chair position, out-of-bed chair, and/or ambulation)
  - Shows improvement in respiratory status
  - Has agitation that is not therapeutically managed

CLRT = continuous lateral rotation therapy

Balancing Oxygen Supply and Demand
**Activities That Increase VO₂**

- Dressing change 10%
- Physical exam 20%
- Agitation 18%
- Bath 23%
- Chest X-ray 25%
- Suctioning 27%
- Increased work of breathing 40%
- Weigh on sling scale 36%
- Position change 31%
- Linen change – occupied bed 22%
- Chest physiotherapy 35%

Strategies to Optimize Patient’s Tolerance to Activities

- Space activities
- Monitor for signs of intolerance
- Pre/post hyperoxygenate
- Determine if the intervention is essential
- Control variables that increase consumption
  - Pain management
  - Agitation management
  - Partial temp regulation
  - Shivering

Lateral Positon & Dangling

- Lateral turn results in a 3%-9% decrease in SVO₂, which takes 5-10 minutes to return to baseline
- Appears the act of turning has the greatest impact on any instability seen
- Studies show similar impact with dangling
- Mechanical ventilation impact within chest wall

Balance the Risk & Benefit

- Determining the timing of the mobility session in relation to other care activities
- Monitoring for tolerance 5 to 10 minutes after the mobilization
- If using the left lateral position
  - potential for greater cardiovascular compromise
  - may necessitate a temporary decision to use supine (head-of-bed elevation) and the right lateral position until able to tolerate

Vollman KM. Crit Care Nurs Q. 2013;36:17-27
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

Consensus on Safe Criteria for Active Mobilization

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

> Low risk of an adverse event. Proceed as usual according to each ICU’s protocols and procedures.

> 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.

> 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.

Categories
- Respiratory
- Cardiovascular
- Neurological
- Other Considerations

Consensus reach on all criteria. If no other contraindications; vasoactives, endotracheal tube, FiO2 < 60% with SaO2 90% & RR < 30/min were considered safe criteria

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

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

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

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

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

HOB=head of bed; HR=heart rate; MAP=mean arterial pressure; SPB=systolic blood pressure.

Vollman KM. Crit Care Nurs Q. 2013;36:17-27

VCU Hemodynamic Instability Guideline

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

A trial should be attempted at least every 8 hours to determine ability to resume frequent turning at least every 2 hours.

1. Provide staff/duties.
2. Elevate head at least every 30 minutes.
3. Position patient's head, arms and legs at least every hour, consider passive ROM.
4. Use Consider use of Continuous Lateral Rotation Therapy to prevent development of "gravitational equilibrium". Begin: SLOW AND LOW angles of turning to gauge patient response.
5. When turning patient: GO SLOW! Provide serial small turns from supine to lateral position to achieve limen changes, hygienic checks, and reduction with wedges and pillows.

UNSTABLE FRACTURES

Patients with unstable pelvic fractures should be monitored continuously, and treatment should be approached w/ care. Consider using pillows or padding between the legs to maintain proper alignment. May use modified “UNSTABLE” (U-shaped) and position patient in side-lying position. Ensure security and proper positioning of collar, then roll patient, and wedge in proper alignment.

O4 Added a reference
Owner, 5/10/2015
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
Universal PUP Bundle with WOC Support = HAPU

- Quasi experimental pre-post design
- Intact skin on admission
- 180 pre received SOC and 146 post intervention received UPUPB & 2x weekly WOC rounding
- Results:
  - HAPU ↓ from 15.5% to 2.1%
  - 204 rounds over 6 months
  - ↑ adherence to heel elevation (p<.001) & repositioning p<.015

SAFER


Patient Skin Integrity Bundle (InSPIRE)


Methodology
- Before & after design
- 105 ICU pts in experimental group
- 102 ICU pts in control group
- Control-SOC
- Intervention: InSPIRE
  - Skin assessment on admission (4hrs) & surface placement
  - Ongoing Q 12
  - Skin hygiene (1x bath pre-package)
  - Turning q 3hrs/turn clock
  - ET & NG evaluated q 12 & repositioned
  - Heel device
  - Microclimate

Results:
- Groups similar on major demographics (age, SOFA, ICU LOS)
- Cumulative HAPU ↓ in intervention group 18.1% vs. 30.4% (p=.04)
- Mucosal injuries ↓ 15% vs. 39% p <.001
- Overall processes of care did not differ
- Device observation/repositioned 76% vs 28% of days (p <.001)
- Bathed only 1x per day in intervention group
- Repositioning q3hrs 83% vs 51% days observed (p<.001)
Intact Skin Is In: Making it Happen

- Advocacy
- Braden subscales
- Skin rounds/time frequency
- Hand-off communication
- The right products and processes-pressure/shear/moisture/prevent skin tear and medical adhesive related injuries
- Quarterly prevalence/incidence of PU & IAD
- Skin liaison/champion nurses
- Creative strategies to reinforce protocol use
  - Visual cues in the room or medical record
  - Rewards for increase compliance
- Yearly competencies on beds or positioning aids to ensure correct and maximum utilization

The Goal: Patient & Caregiver Safety

↓ 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
Forbid yourself to be deterred by poor odds just because your mind has calculated that the opposition is too great. If it were easy, everyone would do it.

Learn from a Defect
What Is a Defect?

• Anything that you do not want to happen again.

Errors Provide Useful Information

• We can learn more from our failures than from success
• Our processes can be improved when studied

“Give me a fruitful error anytime, full of seeds, bursting with its own corrections. You can keep your sterile truth to yourself.”

Vilfred Pareto
Learn from a Defect

• Designed to rigorously analyze the various components and conditions that contributed to an adverse event and is likely to be successful in the elimination of future occurrences.
• Tool can serve to organize factors that may have contributed to the defect and provides a logical approach to breaking down faulty system issues
  – Patient, team, task, caregiver factors
  – Training, education, technology factors
  – Local or institutional environment

Learning From Defects

1. What happened?
   From view of person involved
2. Why did it happen?
3. How will you reduce it happening again?
4. How will you know the risk is reduced?
5. With whom will I share the learnings
Brainstorm #1

Brainstorm #2
Why Did It Happen?

1. WHAT HAPPENED!

Select a detail to learn from. Put yourself in the place of those involved - and in the middle of the events associated with the details as they were unfolding (or as they typically unfold). After you've talked to frontline staff, consider:

- Who was involved?
- What actions occurred?
- What were care team members thinking and feeling? (did they perceive benefits or rewards for certain actions/behaviors)
- What were patients thinking and feeling?
- What was happening at the same time?
- What happened that had a good outcome?
- What happened that had a bad outcome?

TIP: Take time to listen. Seek to understand rather than to judge. Ask clarifying questions and follow-up questions.

2. WHY DID IT HAPPEN?

Contributing factors from all levels of your healthcare system impact care delivery and ultimately patient outcomes. What factors impacted your event? Some examples are identified below. If you are a CQIF Facilitator or CQIP Champion, consider modifying the examples to include areas that would measure with your team.

<table>
<thead>
<tr>
<th>CONTRIBUTING FACTORS</th>
<th>EXAMPLE OF FACTOR</th>
<th>MEDICAL</th>
<th>NON-MEDICAL</th>
<th>SYSTEMS</th>
<th>ENVIRONMENTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient and/or Family Characteristics</td>
<td>Patient frequently collateralizes care</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Family member chooses location, fees, insurance, etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>
Brainstorm # 3
Solution Finding... All ideas are Welcome Necessary

3. HOW WILL YOU REDUCE THE LIKELIHOOD OF THIS DEFECT HAPPENING AGAIN?

APPROACH
Draw a grid and determine where a contributing factor might fit on the grid.

Start with Low Hanging Fruit

[Diagram showing a grid with Low Effort vs. High Effort and Low Impact vs. High Impact, indicating a good target for first intervention]
Start with Low Hanging Fruit

A Good Solution Must Be…

• Clear in how we measure the success
• Trialable and easy to test
• Compatible with or improve existing workflows
• Low cost, low fidelity
Building Resiliency Into Interventions

- Forcing functions and constraints
- Automation and computerization
- Standardization and protocols
- Checklists and independent check systems
- Rules and policies
- Education and information
- Vague warnings – Be more careful!

PDSA and Test of Change
Introducing Tests of Change

• Goal
  – Test potential improvements to the unit’s care processes that have the potential to transform care in large and small ways

• Why It’s Important
  – Small-scale tests of change can help determine whether an idea could result in sustainable improvement
  – Used for action-oriented learning

Principles for Tests of Change

• Test to evaluate if a new idea or innovation will work
  – Adopt
  – Adapt
  – Abandon
• Test small (N = 1)
  – One nurse
  – One shift
  – One patient
• Engage those interested in testing
  – "Nurse friendly"
  – "Curious Team Member"
Principles for Tests of Change

• Don’t wait for a committee approval
• Go to the committee after you have tested and have some data to support the new changes
• Form a hypothesis and collect some data (quantitative and qualitative)
• Revise - it takes many tests to build innovations

How to Do It: Plan-Do-Study-Act (PDSA)

PDSA is at the core of the Institute for Healthcare Improvement’s Model for Improvement
Your Turn, Try a Test of Change
Planning Worksheet

<table>
<thead>
<tr>
<th>SMALL TEST OF CHANGE</th>
<th>WHAT do you need to test this idea?</th>
<th>WHO will be involved in the tests?</th>
<th>HOW will you inform participants?</th>
<th>WHERE will the test occur?</th>
<th>WHEN will the test occur?</th>
<th>HOW will you know it is successful?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When will you compare what happened to your prediction?
When will you decide what to do next?

<table>
<thead>
<tr>
<th>SMALL TEST OF CHANGE</th>
<th>What did you predict will happen?</th>
<th>What happened?</th>
<th>What did you learn?</th>
<th>What are the next steps?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Table Exercise: Develop a Small Test of Change

- Look at your data: HAPI & IAD
- Gap Analysis: what evidence based interventions are you not doing?
- Process data: how well are you implementing all of the prevention strategies
- Information from LFDs at your hospital
- Review evidence based practices

- Identify one small test of change you would like to implement to decrease your infection rates
- Complete Test of Change worksheet
- Share with group
Contact Kathleen Vollman at kvollman@comcast.net
www.Vollman.com