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
- Subject matter expert CAUTI, CLABSI, HAPI, Safety culture
- Consultant and speaker bureau for Sage Products, now part of Stryker
- 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

• Outline evidence-based prevention strategies for incontinence-associated dermatitis, friction reduction, and addressing pressure injury risk factors

• Describe key care process changes that lead to a successful reduction of skin injury and address 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 patient’s host defense through proactive use of evidence-based hygiene care strategies

Incontinence-Associated Dermatitis Prevention Program
INTERVENTIONAL PATIENT HYGIENE (IPH)

- VAP/HAP
- Oral Care/Mobility
- HAND
  - Patient
  - HYGIENE
    - Catheter Care
    - Skin Care/Bathing/Mobility
      - CA-UTI
      - CA-BSI
      - SSI
      - Falls
      - HASI

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

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

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

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

What Does it Mean to Be in a Safe Culture for You & Your Patient?
Changing the Paradigm

Culture of Safety in Healthcare  
Patient Safety

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
• Highly 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 and 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

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

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 ICUs in the UK
  – Analysis on 393 sets of observations
  – Turn defined as supine position to a right or left side lying

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

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

- 687 randomly selected ICUs 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 Program

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

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

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

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

- 5,342 patients in 189 acute care facilities in 36 states
- Prevalence study
  - To measure the prevalence of IAD, describe clinical characteristics of IAD, and analyze the relationship between IAD and prevalence of sacral/coccygeal pressure ulcers
- Results: 2,492 patients incontinent (46.6%)
  - 57% both FI and UI, 27% FI, 15% UI
  - 21.3% IAD rate overall/14% also had fungal rash
  - 45.7% in incontinent patients
    - 52.3% mild
    - 27.9% moderate
    - 9.2% severe
  - 73% was facility-acquired
  - ICU a 36% rate
  - IAD alone and in combination with immobility statistically associated with FAPI

Gray M. Giuliano K. JWOCN. 2018;45(1):63-67
Caregiver Harm
What are Ergonomic Risk Factors

- Duration of Exposure
- Force
- Posture
- Repetition
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 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
The nation is facing an impending shortage of nurses, which is expected to peak by 2020.

Average age of nurses in the U.S. is 46.

We must improve our ergonomic environment to accommodate older nurses.

(Buerhaus, 2004)
Contributing Factors to Injury

- Healthcare is the only industry that considers 100 pounds to be a “light” weight.
- Other professions use assistive equipment when moving heavy items.
- On average, nurses and assistants lift 1.8 tons per shift (ANA, n.d.).

<table>
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<th>Year</th>
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<th>Incidence Rate*</th>
<th>Median Days Away From Work</th>
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* Incidence rate per 10,000 FTE

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)
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

Caregiver Risk

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

Mobility, Skin & Fall Prevention Strategies

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

Immobility Risk

- Skin Risk Factors
- Mobility, Skin & Fall Prevention Strategies
- Caregiver Risk
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
    - Rated 1-4
    - Pressure on tissues
      - Mobility, sensory perception, activity
      - Tissue tolerance for pressure
    - Nutrition, moisture, shear/friction
  - 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-Scales

• Retrospective cohort analysis of 12,566 adult 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 HAPUs
• 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)
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:

- Burn
- Cardiac Surgery
- CCU - General
- CCU - Interventional
- ICU - Cardiovascular
- ICU - General
- ICU - Medical
- ICU - Neuro
- ICU - Neonatal
- ICU - Pediatric
- ICU - Surgical
- LTC
- Medical
- Med/Surg
- Medical/Surgical
- Neurology
- Oncology
- Orthopedic
- Palliative Care
- Pediatric Intensive Care
- Pediatric
- Respiratory/Pulmonary
- Surgical
- Surgical/Neurology
- Trauma/Neurosurgical

**Section 1: Complete for all patients surveyed**

<table>
<thead>
<tr>
<th>Patient Information</th>
<th>Demographic Information</th>
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<tr>
<td><strong>Patient Gender:</strong></td>
<td><strong>Patient Age Group:</strong></td>
</tr>
<tr>
<td>Male</td>
<td>4 to 9 yrs</td>
</tr>
<tr>
<td>Female</td>
<td>10 to 18 yrs</td>
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<tr>
<td></td>
<td>19 to 29 yrs</td>
</tr>
<tr>
<td></td>
<td>30 to 64 yrs</td>
</tr>
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</table>

**Continence Status:**
Incontinence = inability to control the flow of urine and stool in the preceding 24 hours.

- **Incontinence**
- **Incontinence**
- **Stool:**
- **Bed:**
- **Urine:**

**Section 2: Complete only for Incontinent patients**

- **Contributing Factors & Co-Morbidities**
- **Medication:**
- **Diagnosis:**

**Section 3: Complete only for incontinent patients with rash/redness of buttock or perineum**

- **Barrier Protection:**
- **Cleanliness:**
- **Moisturizers:**

**Section 4: Complete for all patients**

- **Area Affected:**
- **Disorders:**
- **Condition:**

- **For the following skin conditions, please indicate whether they affect the skin on the buttocks or perineum:**
- **Incontinence Associated Dermatitis:**
- **Bed and pressure skin damage:**
- **Radiotherapy:**

“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
- Pressure Injuries
- Falls
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 & avoid 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 equipment 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

Evaluated nasal bridge device injury prevention
Evaluated sacral pressure ulcer 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 equipment 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

### Demographic Comparison

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<th></th>
<th>SOC</th>
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<th>P</th>
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<td>7 (1-29)</td>
<td>7 (1-45)</td>
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<td>BMI</td>
<td>29.62</td>
<td>30.97</td>
<td>.65</td>
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</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>
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<tbody>
<tr>
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<td>1a</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>
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</table>

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 Risk factors of HAPI & Patient Handling Injuries

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

Way H, Am JSPHM, 2016;6(4):160-165
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

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

Susan L. Salsbury OTR/L, CDMS, Occupational Therapist, OhioHealth, Columbus, OH • Beth Kaper, 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:
  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 air flow 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.
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

Successful Study 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

53 sedated patients over a 7 month period

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 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

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

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

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

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

Ambulation Assist Devices
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)

Doughty D, etal. JWOCN. 2012;39(3):303-315
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

www.ihi.org
Current Practice: Moisture Management
EBP Recommendations to Reduce Injury From Incontinence & Other Forms of Moisture

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- 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

Innovated Male External Catheter Study

- This project was conducted in a 107-bed long-term acute care hospital.

- **Timeline:** The QI initiative started on 02/21/16.

- **Appropriate ECD Application:** The nursing team was educated on appropriate assessment of male anatomy for ECD placement.

- **Measurement:**
  - Before and after catheter utilization and CAUTI infection rates
  - Increased adherence to best practices was reported on staff surveys (N=30; [15 RNs, 15 CNAs].

- **Foley Catheter Appropriateness Criteria:** Benign prostatic hypertrophy; neurogenic bladder; stage 3 and 4 sacral pressure injury; and strict I&O

- **ECD Appropriateness Criteria:** No restraints; no neurogenic bladder; no benign prostatic hypertrophy; and cooperative with no urinary issues.

- **ECDs were contraindicated:**
  - Patient was unable to void or had known urinary retention
  - Unhealed wound on glans penis
  - Active inflammation or infection of the glans, foreskin or urethra
  - Severe phimosis or severe hypospadias

Quayle BL, Presented at APIC 44th Annual Conference in Portland, Oregon; June 14-16, 2017
46% ↓

Average wear time: 48-72hrs

Quayle BL, Presented at APIC 44th Annual Conference in Portland, Oregon; June 14-16, 2017
How do they work?

- They are placed between the labia and the urethral opening
- The devices are attached to wall suction
- Provide a constant flow of air
- When female voids, the urine flows thru the fabric into the collection chamber at the distal end, the suction takes the urine to the collection container
### Pre/Post Comparison Using Female External Device

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTI Rate</td>
<td>2.55</td>
<td>0.7</td>
</tr>
<tr>
<td>SIR Ratio</td>
<td>1.395</td>
<td>0.381</td>
</tr>
<tr>
<td>Indwelling Catheter Days</td>
<td></td>
<td>↓ 9%</td>
</tr>
</tbody>
</table>

Beeson T, Davis C & Vollman K. Presented at the NACNS Meeting in Austin Tx, March 2, 2018
Fecal Containment Device
Medical Device Related Pressure Ulcers

- Prospective descriptive study to determine, prevalence, risk factors, and characteristics of MDRs PI
- 175 adults in 5 ICUs
- 27 developed non-device related HAPI (15.4%)
- 70 developed MDRs 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>n^a</td>
<td>n^b</td>
</tr>
<tr>
<td>Monitoring</td>
<td></td>
</tr>
<tr>
<td>ECG leads</td>
<td>173 98.8 7 3.3</td>
</tr>
<tr>
<td>ECG electrodes</td>
<td>172 98.2 2 0.9</td>
</tr>
<tr>
<td>BP cuff</td>
<td>171 97.7 2 0.9</td>
</tr>
<tr>
<td>SpO₂ probe</td>
<td>170 97.1 17 8.0</td>
</tr>
<tr>
<td>GI/GU</td>
<td></td>
</tr>
<tr>
<td>Nasogastric</td>
<td>43 24.5 10 4.7</td>
</tr>
<tr>
<td>Orogastic</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 6 2.8</td>
</tr>
<tr>
<td>Vascular lines</td>
<td></td>
</tr>
<tr>
<td>Central</td>
<td>72 41.1 1 0.4</td>
</tr>
<tr>
<td>Arterial</td>
<td>118 67.4 1 0.4</td>
</tr>
<tr>
<td>Peripheral</td>
<td>89 50.8 1 0.4</td>
</tr>
<tr>
<td>Respiratory</td>
<td></td>
</tr>
<tr>
<td>ET tube</td>
<td>67 38.2 95 45.0</td>
</tr>
<tr>
<td>Nasal cannula</td>
<td>54 30.8 14 6.6</td>
</tr>
<tr>
<td>CPAP mask</td>
<td>20 11.4 22 10.4</td>
</tr>
<tr>
<td>Oxygen mask</td>
<td>40 22.8 15 7.1</td>
</tr>
<tr>
<td>Preventive devices</td>
<td></td>
</tr>
<tr>
<td>TED</td>
<td>38 21.7 5 2.3</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 13 6.1</td>
</tr>
<tr>
<td>Total</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/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.

HanonuS & Karadag A. OWN, 2016;62(2):12-22
Medical Device Related 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 - 1.050</td>
</tr>
<tr>
<td>Enteral feeding</td>
<td>.045b</td>
<td>2.12</td>
<td>.785 - 3.125</td>
</tr>
<tr>
<td>With traditional HAPUs</td>
<td>.001b</td>
<td>6.600</td>
<td>1.210 - 15.120</td>
</tr>
<tr>
<td>Medical ICU</td>
<td>.001b</td>
<td>7.041</td>
<td>2.144 - 23.126</td>
</tr>
<tr>
<td>Neurosurgical ICU</td>
<td>.011b</td>
<td>6.221</td>
<td>1.520 - 25.454</td>
</tr>
<tr>
<td>Chest diseases ICU</td>
<td>.009b</td>
<td>6.014</td>
<td>1.557 - 23.228</td>
</tr>
<tr>
<td>High risk Braden Scale score</td>
<td>.040b</td>
<td>1.815</td>
<td>1.029 - 3.205</td>
</tr>
<tr>
<td>Mechanical ventilation</td>
<td>.147</td>
<td>2.075</td>
<td>.773 - 5.568</td>
</tr>
<tr>
<td>Use of steroids</td>
<td>.649</td>
<td>.806</td>
<td>.318 - 2.042</td>
</tr>
<tr>
<td>Use of anticoagulants</td>
<td>.138</td>
<td>2.079</td>
<td>.791 - 5.466</td>
</tr>
<tr>
<td>Use of sedatives</td>
<td>.088</td>
<td>2.565</td>
<td>.868 - 7.578</td>
</tr>
<tr>
<td>Low albumin g/dl</td>
<td>.056</td>
<td>.527</td>
<td>.280 - .990</td>
</tr>
<tr>
<td>Low hemoglobin g/dl</td>
<td>.104</td>
<td>1.170</td>
<td>.968 - 1.413</td>
</tr>
</tbody>
</table>

HAPUs = hospital-acquired pressure ulcers; ICUs = intensive care units; MDR PU = medical-device related pressure ulcers; CI = confidence interval; OR = odds ratio
*mean age 67.4±6.1; **P <.05; †mean albumin 2.8±0.7; ‡mean hemoglobin 9.7±1.7

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

HanouuS & 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)

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
Progressive Mobility + Caregiver Safety + Skin Safety + Fall Safety
Challenges to Mobilizing Patients

Potentially Modifiable Barriers

• Patient-related barriers (50%)
  – Hemodynamic instability, ICU devices, physical & neuropysch

• Structural (18%)
  – Human or Technological Resources

• ICU culture (18%)
  – Knowledge/Priority/Habits

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

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

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

Yes → Initiate continuous lateral rotation therapy via a protocol to train the patient to tolerate turning

No → Begin in-bed mobility techniques and progress out-of-bed mobility as the patient tolerates

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

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

No → Allow the patient a minimum of 10 minutes of rest between activities, then try again to determine tolerance

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

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

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

No → Try the position turn or HOB maneuver slowly to allow adaption of cardiovascular response to the inner ear position change

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

Structure

- Make it Prescriptive
- Overcoming barriers
- Daily Integration

Process

Outcomes
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 increased 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.
Contact Kathleen Vollman at
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www.Vollman.com