Back to the Basics: Getting There with Science

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Disclosures

- Sage Products Speaker Bureau & Consultant
- Hill-Rom Speaker Bureau
- Eloquest Healthcare Speaker Bureau & Consultant
- Bard Speaker Bureau
Objectives

- Create the link of patient advocacy to the basic nursing care
- Discuss strategies to identify patients at risk for skin injury
- Identify the evidence based steps for bathing
- Outline evidence-based prevention strategies for incontinence associated dermatitis and reducing shear, friction and pressure risks
- Describe key care processes or program components leading to a successful reduction in skin injury, and determine when and how to begin a similar improvement initiative
- Identify strategies for reduction of non-vent hospital acquired pneumonia

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

- Hand Hygiene
- Comprehensive Oral Care Plan
- Catheter Care
- Pressure Ulcer Prevention
- Bathing & Assessment

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
INTERVENTIONAL PATIENT HYGIENE (IPH)

Hand

Patient

Oral Care/Mobility

Catheter Care

Skin Care/Bathing/Mobility

VAP/HAP

CA-UTI

CLA-BSI

SSI

HASI

Achieving the Use of the Evidence

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

Skills & Knowledge

Resources & System

Value

Attitude & Accountability

Vollman KM. Australian Crit Care, 2009;22(4):152-154

Missed Nursing Care

- “Any aspect of required patient care that is omitted (either in part or whole) or significantly delayed.”
- A predictor of patient outcomes
- Measures the process of nursing care

Hospital Variation in Missed Nursing Care

Figure 2. Elements of care most and least frequently missed. The solid bars represent the means across all 10 hospitals, and the range lines indicate the standard deviations.

Patient Perceptions of Missed Nursing Care


<table>
<thead>
<tr>
<th>Elements of Nursing Care by Ability of Patient to Report and Extent Missed*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fully Reportable</td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>Frequently Missed</td>
</tr>
<tr>
<td>Mouth care</td>
</tr>
<tr>
<td>Listening</td>
</tr>
<tr>
<td>Being kept informed</td>
</tr>
<tr>
<td>Sometimes Missed</td>
</tr>
<tr>
<td>Response to call lights</td>
</tr>
<tr>
<td>Response to alarms</td>
</tr>
<tr>
<td>Meal assistance</td>
</tr>
<tr>
<td>Pain medication and follow-up</td>
</tr>
<tr>
<td>Rarely Missed</td>
</tr>
<tr>
<td>Bathing</td>
</tr>
<tr>
<td>Hand washing</td>
</tr>
</tbody>
</table>

* IV: intravenous

Why HAI's?
Protecting Patients From Harm

Estimates: 183 Hospitals in 10 States

- HAI: 722,000/year
- HAI-related deaths: 75,000/year
- Hospitalized patients develop infection: 1 out of 25 (4%)
- Death due to sepsis/septic shock: 700/day
- Money spent: $45 billion/year
- Increase risk of readmission: 27 days vs. 59 days

Common Routes of Transmission

Reducing MDRO’s

- Hand hygiene (Electronic versus direct observation more accurate in measuring compliance)\(^1\)
- Decontamination of environment and equipment
- Ultraviolet–C to kill pathogens.\(^2,3\)
  - After 45 minutes of use, *C. difficile* spores were reduced by up to 99 percent.
  - 15 minutes for non-spore forming bacteria
- Skin flora\(^4\)
- Practice the device bundles (VAP, BSI, UTI)\(^5\)

\(^{1}\)Morgan DJ, et al. AJIC, 2012;40:955-959
\(^{2}\)Nerandzic MM, et al. BMC Infect Dis 2010 Jul 8;10:197
\(^{3}\)Hayes NL et al. Infect Control Hosp Epidemiol, 2012;33:507-512
\(^{5}\)www.ihi.org
The Bath: The First Line Of Defense

Nurse!!!

Early Detection of Skin Injury

Reducing Microorganism spread

Efficiency & Effectiveness

Health/Social Well Being

Patients At Risk

Multi-Drug Resistant Organisms
- Immunodeficiencies
- Breaks in skin integrity related to invasive devices
- Co-morbidities
- Hand transmission
- Equipment contamination/Hospital environment

Damaging the Natural Barriers to Infection...the Skin
- Bathing techniques
- Soaps
- Wash cloths

Bonten MJM. Am J Respir Crit Care Med. 2011;184:991-993
Optimal Hygiene

- pH balanced (4-6.8)
  - Stable pH discourages colonization of bacteria & ↓ risk of infection
  - Bar soaps may harbor pathogenic bacteria
- Excessive washing/use of soap compromises the water holding capacity of the skin
- Non-drying, lotion applied
- Multiple steps can lead to large process variation

References:

Voegel D. J WOCN, 2008;35(1):84-90

Traditional Bathing

Why are there so many bugs in here?

Soap and water basin bath was an independent predictor for the development of a CLABSI

Bath Basins: Potential Source of Infection

- Multicenter sampling study (3 ICU’s) of 92 bath basins
- Identify & quantify bacteria in patients basins
- Sampling done on basins used > 2x in patients hospitalized > 48 hours & preformed 2 hours post bath
- Cultures sent to outside laboratory
- Qualitative vs. quantitative measures used to exclude growth that may have occurred in transport
- Bathing practices not controlled & no

The Evidence: Bath Basins
Potential Source of Infection

Multicenter Sample Study to Identify and Quantify Bacteria in Basins

- Enterococci 54%
- Gram negative 32%
- S. aureus 23%
- VRE 13%
- Less than 10% growth rates
  - MRSA 8%
  - P. aeruginosa 5%
  - Candida albicans 3%
  - E. coli 2%

Bath Basins
Potential Source of Infection

Large multi-center study evaluates presence of multi-drug resistant organisms

- Total hospitals: 88
- Total basins: 1103

- Contaminated: 686 basins/88 hospitals (62%)
- Gram negative bacilli: 495 basins/86 hospitals (45%)
- Colonized w/ VRE: 385 basins/80 hospitals (35%)
- MRSA: 36 basins/28 hospitals (3%)


Mechanisms of Contamination

- Skin flora
- Multiple-use basins
  - Incontinence cleansing
  - Emesis
  - Product storage
- Bacterial biofilm from tap water

Waterborne Infection

Hospital Tap Water
- Most overlooked source for pathogens
- 29 studies demonstrate an association with HAIs and outbreaks
- Transmission:
  - Drinking
  - Bathing
  - Rinsing items
  - Contaminated environmental surfaces
- Immunocompromised patients at greatest risk


Impact on UTI with Basin Bathing

UTI Rate- Removal of Prepackaged Bath Product QTR 3 FY05

The Effect of Bathing with Basin and Water and UTI Rate, LOS and Costs

Unit Census: 14

<table>
<thead>
<tr>
<th>Phases</th>
<th>Product Cost/ No. of UTI</th>
<th>Median^4 LOS 17 Days</th>
<th>Median^4 Cost (4857.00)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I- Pre-Packaged Bathing Washcloths (9 months)</td>
<td>$10,530^1 ($3.00)</td>
<td>25</td>
<td>$117,175</td>
</tr>
<tr>
<td>II- Basin/Water (9 months)</td>
<td>$3,510^2 ($1.00)</td>
<td>48</td>
<td>$224,916</td>
</tr>
<tr>
<td>III- Additional Product Cost, UTI, LOS, COSTS</td>
<td>$7,020 23^3</td>
<td>151</td>
<td>$107,741</td>
</tr>
</tbody>
</table>

^1 Based on 3 packages of 8 towels each ^2 Based on product cost of towels, soap, and basin ^3 Difference between phase I pre-package/phase II basin water

Prepackaged Disposable Bathing

Studies show

Prepackaged disposable bathing cloths result in...

• Nurse satisfaction
• Improved skin condition

• 78% fewer UTIs
• Amount of product used
• Time spent
• Cost
• Variation in bathing process

Recommendations and Implementation Strategies

1. Bath patients daily in ICU with basinless bathing

2. Patient-centered bath times
   - Evaluate clinical stability and patient preference.
   - Avoid bathing between 2400 - 0600.
   - Evaluate workloads on all shifts.
   - Adjust distribution of care practices.

3. Avoid reusable bath basins and use of washcloths
   - Remove soaps and creams from the unit stock.
   - Replace basin with better strategies for containing emesis and keeping supplies.
   - Reduce par levels of washcloths.

4. Avoid tap water for any component of bathing ICU patients

5. Use a no-rinse pH-balanced cleanser for facial cleansing

For Successful Banning of Basins for Patient Care

- We need to provide alternatives for the other functions:

<table>
<thead>
<tr>
<th>Current</th>
<th>New</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emesis</td>
<td>Emebags being installed in every adult and ped pt. room, ACU, PACU</td>
</tr>
<tr>
<td>Storage of patient items</td>
<td>Clear plastic “baggies”</td>
</tr>
<tr>
<td></td>
<td>Trial of “Concierge List” to decrease waste of unused/unneeded products</td>
</tr>
<tr>
<td>Foot soaks</td>
<td>Shampoo caps, prepackaged</td>
</tr>
<tr>
<td>Shampoo patient’s hair</td>
<td>Shampoo caps par’d on all units</td>
</tr>
<tr>
<td>24 hour urine, ice</td>
<td>Store some basins in lab to be dispensed with each 24 hour jug.</td>
</tr>
<tr>
<td>Bath cloths with no insulation, cold halfway through bath.</td>
<td>Bath cloths with insulation to stay warm longer</td>
</tr>
</tbody>
</table>
Pressure Ulcer (PU) Facts

- 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%
- Incidence in acute care 4.5% (Hill-Rom 2011 Pressure Ulcer Prevalence Study)
- Acute care: 0-12%, Critical care: 3.3% to 53.4% (International Guidelines)
- Most severe pressure ulcer: sacrum (44.8%) or 5he heels (24.2%)
- 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

Identify Patients at High Risk

Reddy, M.et al. JAMA, 2006; 296(8):974-984
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 Tissue Sore
  - 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


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)

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)

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

Oliver Wendell Holmes
11/5/2015

Risk Factors

Pressure

Critically Ill Patient

Shear /Friction

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 surface when determining freq
  - Cushioning devices to maintain alignment / 30° side-lying & prevent pressure on boney prominences
  - Use lifting device or other aids to reposition & make it easy to achieve the turn
  - Assess whether actual offloading has occurred

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)


EBP Recommendations to Reduce Shear & Friction

- Loose covers & increased immersion in the support medium increase contact area
- 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
Current Practice: Turn & Reposition

- Disposable Slide Sheets
- Draw Sheet/Pillows/Layers of Linen
- Lift Device

50% of nurses required to do repositioning suffered back pain
- High physical demand tasks
  - 31.3% up in bed or side to side
  - 37.7% transfers in bed
- 40% of critical care unit caregivers performed repositioning tasks more than six times per shift

Number one injury causation activity: Repositioning patients in bed

Harber P, et al. J Occupational Medicine, 27;518-524
Fragala G. AAOHN, 2011;59:1-6
## Number, Incidence Rate, & Median Days Away From Work for Occupational Injuries RN's with Musculoskeletal Disorders in US, 2003 – 2011

<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>2002</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>2013</td>
<td>Private Industry</td>
<td>RN</td>
<td>9,820</td>
<td>-</td>
<td>7</td>
</tr>
</tbody>
</table>


## Achieving the Use of the Evidence For Mobility & Moisture

### Resource & System

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

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

- Skills & Knowledge
- Resources & System
- Value
- Attitude & Accountability

Made a correction--previous number for 2013 included private state and local. This number just reflects private like the others
Owner, 5/10/2015
Comparative Study of Two Methods of Turning & Positioning

- Blocked design with convenience sample of 60 patients
- SOC: pillows/draw sheet
- TAP: breathable glide sheet/foam wedges/wick away pad

**Results:**
- Nurse satisfaction 87% versus 34%
- 30° turn achieved versus 0-15 in SOC
- SOC group required more resources

<table>
<thead>
<tr>
<th></th>
<th>SOC</th>
<th>TAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time on Product</td>
<td>7 days (1.29)</td>
<td>7 days (1.45)</td>
</tr>
<tr>
<td>Age</td>
<td>57.72 (SD 18.45)</td>
<td>57.73 (SD 17.87)</td>
</tr>
<tr>
<td>Gender</td>
<td>14 Female, 16 Male</td>
<td>10 Female, 20 Male</td>
</tr>
<tr>
<td>Mobility</td>
<td>0.1</td>
<td>0.1</td>
</tr>
<tr>
<td>BMI</td>
<td>29.02</td>
<td>30.97</td>
</tr>
<tr>
<td>PU development</td>
<td>0</td>
<td>1*</td>
</tr>
<tr>
<td>Pulled up in bed</td>
<td>3.38</td>
<td>2.58</td>
</tr>
<tr>
<td>Number to turn</td>
<td>1.97</td>
<td>1.95</td>
</tr>
</tbody>
</table>


Safe Patient Handling Initiative: Decreases Staff Musculoskeletal Injuries & Patient Pressure Ulcers

- Way H, Presented at the 2014 Safe Patient Handling East Conference on March 27, 2014

**RESULTS**

- 28%↓ $184,720 savings
- 58%↓ $247,500 savings
In-Bed Technology

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
- Seated support surfaces for patients with limit mobility when sitting in a chair

Support Surfaces In Critically Ill Patients

- Comparison cohort study of 2 different support surfaces in critically ill patients
- 52 critically ill patients with anticipated 3 day LOS in a 12 bed cardiovascular unit in a University Hospital in the Mid-west were included until d/c from ICU
- 31 patients: low air-loss weight-based pressure redistribution-microclimate management bed
- 21 patients: integrated powered air redistribution bed
- Measured: positioning, skin assessment, heel elevation

**Results:**
- Mean LOS 7 days (on the surface equal amount of days)
- LAL-MCM bed = zero pressure ulcers
- IP-AR bed = 4/21 or 18% (p=0.046)


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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

Thomensen GE, et al. CCM 2006;36;1119-1124
Winkelma C et al., CCN 2010;30:36-80
EBP Recommendations to Achieve Offloading & Reduce Pressure

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Roger Si et al. OWM, 2007;52(10):S5-S8; www.ihi.org

Out of Bed Technology
Current Seating Positioning Challenges

Uncomfortable

- Airway & Epiglottis compressed
- Lack of Body Alignment
- Shear/Friction
- Sacral Pressure
- Frequent repositioning & potential caregiver injury
- Potential fall risk

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

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

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

Quality Improvement Initiative to ↓ FAHPU’s

- 4 tier Process
- Partnership
- Comprehensive product review
- Education & engagement
- Support structures & processes

18th Annual Conference of the Canadian Association of Wound Care, November 8-11, 2012, London, Ontario

Risk Factors

- Pressure
- Shear/Friction
- Moisture
- Critically Ill Patient

18th Annual Conference of the Canadian Association of Wound Care, November 8-11, 2012, London, Ontario
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

Brown DS & Sears M, OWM 1993;39:2-26

IAD Assessment Tool
IAD: Multisite Epidemiological Study

- 791 patients in 20 facilities in US
- One day prevalence
  - 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: Incontinence 54%
  - 16.3% perineal skin damage, (23.3%) IAD
  - All patients had urinary or fecal incontinence or both
  - 26% was present on admission, 74% was hospital acquired
  - IAD was associated with an increased prevalence of sacral/coccygeal pressure ulcers (p<0.000).

Gray M, Presented at the 23rd Annual Meeting of the Wound Healing Society; SAWC Spring/WHS Joint Meeting: Denver, Colorado • May 1 - 5, 2013

Impact of Moisture

- Urinary and fecal incontinence are common in the acute care setting, occurring in more than one-third of hospitalized adults.
- Humidity/Moisture:
  - Strain at which the skin breaks is 4x greater with excess moisture than dry skin
  - Moisture increases the risk of shear & friction damage

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

www.ihi.org
Current Practice: Moisture Management

- Disposable Incontinence Pads
- Reusable Incontinence pads
- Adult diaper
- Airflow pads for Specialty Beds

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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


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www.ihi.org
Fecal Containment Device

- Provides a method for managing fecal incontinence.
- Remains securely attached to ambulatory patients.
- Kit contains collection bag, closure clip, drainage bag adapter, powder adhesive and adhesive remover.

Cleansing of Patients with Indwelling Catheter

- Indwelling catheter care should occur with the daily bath (basinless bathing)*
- There is no evidence to support 2x a day indwelling catheter care
- If a large liquid stool occurs, bathe the patient with basin less bathing (clean front to back in the perineal area and 6 inches of the catheter**)
- Apply barrier cloth to area of skin requiring protection


Sage recommends following hospital policy.
Before & After QI Project

- 60 day comparison
- Use of a novel EMC device vs. indwelling catheter
- Inclusion criteria:
  - No restraints
  - No BPH
  - No neurogenic bladder
  - Cooperative
  - Hospitalize 2 wks or greater
- Monitored wear time and evaluated the skin

Average Wear Time = 24hrs

Fitzwater M, IP Kindred Albuquerque, 2015

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

Will Rogers
1. **Risk Factors**

- Pressure
- Moisture
- Shear/Friction
- Device Injury

2. **Medical Device Related Pressure Ulcers**

- **MDR**: Quantify the problem & identify risk factors
- Used subset of 8 qtrs. of pressure ulcer incidence & prevalence studies (N=2178)
- MDR HAPU and HAPU groups share similar risk factors.
- Overall HAPU 5.4% (113/2079)
- Proportion with MDR HAPU 34.5% (39/113)
- Similar incidence in ICU, step-down & medical surgical units

*Medical Devices*

- Anti-embolic stockings
- Cervical collars
- Endotracheal tubes/commercial endotracheal tube holders
- Face masks for non-invasive positive pressure ventilation
- Fecal containment devices
- Nasal cannulas
- Pulse oximetry probes
- Radial artery catheters
- Sequential compression devices
- Splints and braces
- Urinary catheters

Medical Device Related Pressure Ulcers

- MDR HAPU Location:
  - Ear (35%)
  - Lower leg (11%)
  - Heels (8%)
- Non-MDR HAPU
  - Sacrum-coccyx
  - Heels
  - Buttocks

Having a medical device you are 2-4x more likely to develop a HAPU of any kind \( (p=0.0008) \)

Prevention Therapies to Reduce MDR-HAPU’s

- Skin protection under oxygen tubing
- Duoderm on bridge of nose of CPAP patients & Preventon® boots initiated

Risk Factors

- Pressure
- Perfusion Instability
- Acute Care
- Moisture
- Device Injury
- Shear/Friction

Makes sure the device fits properly, consider use of a prophylactic dressing (hydrocolloid or transparent film) & inspect the skin under the device x2 daily
Hemodynamic Instability

???

Is it a Barrier to Positioning?

The Role of Hemodynamic Instability in Positioning¹,²

- 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
- Minimize factors that contribute to imbalances in oxygen supply and demand
- Factors that put patients at risk for intolerance to positioning:³
  - Elderly
  - Diabetes with neuropathy
  - Prolonged bed rest
  - Low hemoglobin and cardiovascular reserve
  - Prolonged gravitational equilibrium⁴,⁵

Decision Making Tree for Patients Who Are Hemodynamically Unstable with Movement

**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?
  - Yes: Begin 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 tolerances

- Is the patient still hemodynamically unstable after allowing 5-10 minutes adaptation post-position change before determining tolerance?
  - Yes: Allow the patient a minimum of 10 minutes of rest between activities, then try again to determine tolerance
  - No: Try the position turn or HOB maneuver slowly to allow adaptation of cardiovascular response to the inner ear position change

- 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 tolerances
  - No: Try the position turn or HOB maneuver slowly to allow adaptation of cardiovascular response to the inner ear position change

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

**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
04  Added a reference
Owner, 5/10/2015
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

Universal PUP Bundle with WOC Support = HAPU

- Quasi experimental pre-post design
- Intact skin on admission
- 180 pre-intervention 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)

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)

Sustaining Your Initiative
- Advocacy
- Braden subscales
- Skin rounds/time frequency
- Hand-off communication
- The right products and processes
- 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
Preventing NV-HAP Through Evidence Based Fundamental Nursing Care Strategies

Build the Will: NV-HAP?

- HAP 1st most common HAI in U.S.
  - Increased morbidity $\rightarrow$ 50% are not discharged back home
  - Increased mortality $\rightarrow$ 18%-29%
  - Extended LOS $\rightarrow$ 4-9 days
  - Increased Cost $\rightarrow$ $28K$ to $109K$
  - 2x likely for readmission <30 day
- Understudied, under-addressed
- Focus has been on the other HAP $\rightarrow$ VAP
- Surveillance not required....yet

Hospital-Acquired Pneumonia: Non-Ventilated versus Ventilated Patients in Pennsylvania

Purpose:
- Compare VAP and NV-HAP incidence, outcomes

Methods:
- Pennsylvania Database queried
- All nosocomial pneumonia data sets (2009-2011)

Results:
- Mortality
- Incidence
- Total deaths
- Total cost
- Wide-spread

Note: NV-HAP refers to non-ventilated hospital-acquired pneumonia and VAP refers to ventilator-associated pneumonia.
**NV-HAP SMCS Research Findings: 2010**

**Inclusion criteria:**
All adult discharges, ICD-9 codes of pneumonia not POA AND met CDC definition of HAP

**Incidence:**
- 115 adults
- 62% non-ICU
- 50% surgical
- Average age 66
- Common comorbidities:
  - CAD, COPD, DM, GERD
- Common Risk Factors:
  - Dependent for ADLs (80%)
  - CNS depressant meds (79%)

**Cost:**
- $4.6 million
- 23 deaths
- Mean Extended LOS 9 days
- 1035 extra days


---

**Pathogenesis → Prevention**

- **Germs in Mouth**
  - Dental plaque provides microhabitat
  - Bacteria replicate 5X/24 hrs

- **Aspirated into Lungs**
  - Most common route
  - 50% of healthy adults micro-aspirate in sleep

- **Weak Defenses**
  - Poor cough
  - Immunosuppressed
  - Multiple co-morbidities
Risk Factors for Oral Bacteria in the Hospital

- Poor oral health in the U.S. (CDC, 2011)
- Increased bacteria counts
  - Plaque, gingivitis, tooth decay
  - Reduced salivary flow
- 24-48 hours for HAP pathogens in mouth
- If aspirated =100,000,000 bacteria/ml saliva into lungs

Oral Cavity & VAP

- 89 critically ill patients
- Examined microbial colonization of the oropharynx throughout ICU stay
- Used pulse field gel electrophoresis to compare chromosomal DNA
- Results:
  - Diagnosed 31 VAPs
  - 28 of 31 VAP's the causative organism was identical via DNA analysis
- 49 elderly nursing home residents admitted to the hospital
- Examined baseline dental plaque scores & microorganism within dental plaque
- Used pulse field gel electrophoresis to compare chromosomal DNA
- Results:
  - 14/49 adults developed pneumonia
  - 10 of 14 pneumonias, the causative organism was identical via DNA analysis

El-Solh AA. Chest. 2004;126:1575-1582

http://helios.bto.ed.ac.uk/bto/microbes/biofilm.htm
Loesche, W. 2012
Phase 2: Could NV-HAP be decreased simply brushing the patient’s teeth?

Impact of Oral Care on HAP

SMCS HAP Prevention Plan

Phase 2: Oral Care

- Formation of new quality team: Hospital-Acquired Pneumonia Prevention Initiative (HAPPI)
- New oral care protocol to include non-ventilated patients
- New oral care products and equipment for all patients
- Staff education and in-services on products
- Ongoing monitoring and measurement – Monthly audits


Gap Analysis

<table>
<thead>
<tr>
<th>Best Practice</th>
<th>Our Gaps</th>
<th>Action To Take</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehensive oral care for all (CDC, SHEA)</td>
<td>ICU vent patients only</td>
<td>Develop inclusive oral care protocol</td>
</tr>
<tr>
<td>Oral CHG (0.12%) periop adult CV surgery and vent pts. (CDC, ATS, IHI).</td>
<td>Not using CHG on these patients.</td>
<td>Added to preprinted orders, and to protocol</td>
</tr>
<tr>
<td>Therapeutic oral care tools (ADA)</td>
<td>Poor quality oral care tools. Absence of denture care supplies.</td>
<td>New tools and supplies.</td>
</tr>
</tbody>
</table>
**Protocol – Plain & Simple**

<table>
<thead>
<tr>
<th>Patient Type</th>
<th>Tools</th>
<th>Procedure</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self Care / Assist</td>
<td>Brush, paste, rinse, moisturizer</td>
<td>Provide tools, brush 1-2 minutes rinse</td>
<td>4 X / day</td>
</tr>
<tr>
<td>Dependent / Aspiration Risk</td>
<td>Suction toothbrush kit (4)</td>
<td>Package instructions</td>
<td>4 X / day</td>
</tr>
<tr>
<td>Dependent / Vent</td>
<td>ICU Suction toothbrush kit (6)</td>
<td>Package instructions</td>
<td>6 X / day</td>
</tr>
<tr>
<td>Dentures</td>
<td>Tools + Cleanser Adhesive</td>
<td>Remove dentures &amp; soak, brush gums, mouth rinse</td>
<td>4X / day</td>
</tr>
</tbody>
</table>

**Provide Meaningful Data**

- Ortho Unit had ZERO HAP cases in the last 4 months of 2013!!
- Great WORK!!
- Remember, the goal is to provide and document oral care after each meal and before bedtime.
Provide Meaningful Data

Frequency of Oral Care: Increased in the ICU

Frequency of Oral Care for Non-vented patients in the ICU ↑ 300%
Open Heart Surgery Patients: NV-HAP Reduced 75%

Oral chlorhexidine periop started

NV-HAP Incidence 50% Decrease from Baseline

Control chart for NV-HAP January 2010 to December 2013
Return on Investment

- 60 NV-HAP avoided Jan 1 – Dec. 31 2013
- $2,400,000 cost avoided
- - 117,600 cost increase for supplies
- $2,282,400 return on investment

• 12 lives saved

PRICELESS

HAP Significant Trend Downward
Jan 2010-June 2014
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??”

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.
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