The Power of One: Impacting Patient Outcomes by Returning to the Basics

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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 for CAUTI and CLABSI for CMS/HEN 1.0 & 2.0
- Consultant and speaker bureau for Sage Products LLC
- Consultant and speaker bureau for Hill-Rom Inc
- Consultant and speaker bureau for Eloquest Healthcare
Session Objectives

- Create the link of patient advocacy to the basic nursing care
- Define key fundamental evidence based nursing care practices that reduce non-vent HAP and safely improve in-bed and out of bed mobility for the patient and caregiver
- Discuss strategies to overcome barriers
“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

Hand Hygiene

Comprehensive Oral Care Plan

Bathing & Assessment

Catheter Care

Pressure Ulcer Prevention
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

Achieving the Use of the Evidence

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

Vollman KM. Australian Crit Care, 2009;22(4): 152-154
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!
## Why HAI's? Protecting Patients From Harm

<table>
<thead>
<tr>
<th>Estimates: 183 Hospitals in 10 States</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAI:</td>
</tr>
<tr>
<td>HAI-related deaths:</td>
</tr>
<tr>
<td>Hospitalized patients develop infection:</td>
</tr>
<tr>
<td>Death due to sepsis/septic shock:</td>
</tr>
<tr>
<td>Money spent:</td>
</tr>
<tr>
<td>Increase risk of readmission:</td>
</tr>
</tbody>
</table>

# Health Care Associated Infection Data

<table>
<thead>
<tr>
<th>Measurement</th>
<th>NHSN 2013 3815 Acute Care Hospitals</th>
<th>Estimated # of Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td>HAP/per 1000 patient days</td>
<td></td>
<td>*157,500 (21.8%)</td>
</tr>
<tr>
<td>VAP/per 1000 vent days</td>
<td>Range of pooled means 0.2 (Ped CVICU) -4.4 (Burn ICU)</td>
<td>*49,900</td>
</tr>
<tr>
<td>CLA-BSI/per 1000 cath days</td>
<td>Range of pooled means 0.0 (Prenatal) -2.9 (Burn ICU) Step-down 0.6 (Adult) -1.4 (Peds)</td>
<td>*15,600</td>
</tr>
<tr>
<td>MBI-LCBI excluded</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CA-UTI/per 1000 cath days</td>
<td>Range of pooled means 0.0 (Peds Surgical) -4.8 (Burns) Stepdown 0.8 (Peds) – 1.7 (Adults)</td>
<td>*35,600</td>
</tr>
</tbody>
</table>

Economic Burden of HAI’s: Build The Business Case

- Generated point estimates for attributable cost & LOS
- 5 Major Infections=9.8 billion
  - SSI’s, CLABSI’s, VAP/VAE, CAUTI’s, C-Diff
- SSI’s (33.7%)
- VAP (31.6%)
- CLA-BSI (18.9%)
- C-Diff (15.4%)
- CA-UTI <1%

Per Case Basis

<table>
<thead>
<tr>
<th></th>
<th>SSI</th>
<th>CLABSI</th>
<th>VAP</th>
<th>CAUTI</th>
<th>C-Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>$20,785</td>
<td>$45,814</td>
<td>$40,144</td>
<td>$896</td>
<td>$11,285</td>
</tr>
</tbody>
</table>
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></th>
<th>Fully Reportable</th>
<th>Partially Reportable</th>
<th>Not Reportable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequently Missed</td>
<td></td>
<td></td>
<td>Patient assessment</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Surveillance</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>IV site care</td>
</tr>
<tr>
<td>Sometimes Missed</td>
<td></td>
<td></td>
<td>Ambulation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Discharge planning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Patient education</td>
</tr>
<tr>
<td>Rarely Missed</td>
<td></td>
<td></td>
<td>Medication administration</td>
</tr>
<tr>
<td></td>
<td>Bathing</td>
<td></td>
<td>Repositioning</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Vital signs</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Hand washing</td>
</tr>
</tbody>
</table>

* IV, intravenous.

Source Control: The Oral Cavity as a Risk Factor in NV-HAP and VAP
Build the Will: NV-HAP?

- HAP 1st most common HAI in U.S.
  - Increased morbidity → 50% are not discharged back home
  - Increased mortality → 18%-29%
  - Extended LOS → 4-9 days
  - Increased Cost → $28K to $109K
  - 2x likely for readmission <30 day
### Compelling Incidence Data

<table>
<thead>
<tr>
<th>Study</th>
<th>Incidence</th>
<th>Mortality</th>
<th>+LOS</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>J. Davis (2012) Pennsylvania</td>
<td>5,600 /3 yrs</td>
<td>18.9%</td>
<td>Not queried</td>
<td>$28,000</td>
</tr>
<tr>
<td>HCUP National database (P)</td>
<td>2/100 pts</td>
<td>14.5%</td>
<td>4 days</td>
<td>$36,400</td>
</tr>
<tr>
<td>CDC (2014)</td>
<td>13% of all HAIs</td>
<td>19%-50%</td>
<td>4-9 days</td>
<td>$40,000</td>
</tr>
</tbody>
</table>

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Slide courtesy of Barb Quinn

Davis, Pt Safety Authority 2012 9(3).
Giuliano, K. et al. (2016) APIC Podium 2016
Magill, S.S. et al. (2014) NEJM. 370(13), p 1198-1208
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:

<table>
<thead>
<tr>
<th>YEAR</th>
<th>NO. OF NV-HAP CASES</th>
<th>NO. OF NV-HAP DEATHS</th>
<th>% OF NV-HAP CASES CONTRIBUTING TO DEATH</th>
<th>NO. OF VAP CASES</th>
<th>NO. OF VAP DEATHS</th>
<th>% OF VAP CASES CONTRIBUTING TO DEATH</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009</td>
<td>1,976</td>
<td>363</td>
<td>18.4 (95% CI: 16.5 to 20.3)</td>
<td>922</td>
<td>163</td>
<td>17.7 (95% CI: 15.0 to 20.5)</td>
</tr>
<tr>
<td>2010</td>
<td>1,848</td>
<td>366</td>
<td>19.8 (95% CI: 17.8 to 21.8)</td>
<td>737</td>
<td>144</td>
<td>19.5 (95% CI: 16.3 to 22.7)</td>
</tr>
<tr>
<td>2011</td>
<td>1,773</td>
<td>315</td>
<td>17.8 (95% CI: 15.8 to 19.7)</td>
<td>640</td>
<td>127</td>
<td>19.8 (95% CI: 16.4 to 23.3)</td>
</tr>
<tr>
<td>Total</td>
<td>5,597</td>
<td>1,044</td>
<td>18.7 (95% CI: 17.5 to 19.8)</td>
<td>2,299</td>
<td>434</td>
<td>19.9 (95% CI: 17.1 to 20.7)</td>
</tr>
</tbody>
</table>

Note: NV-HAP refers to nonventilator-hospital-acquired pneumonia and VAP refers to ventilator-associated pneumonia.

• Mortality
• Incidence
• Total deaths
• Total cost
• Wide-spread

Incidence, Prevalence of NV-HAP: A Local Study (2010)

• Purpose:
  – Determine incidence and clinical factors of NV-HAP

• Method:
  – Descriptive, quasi-experimental study using retrospective data
  – Inclusion criteria:
    • All adult discharges
    • ICD-9 codes of pneumonia not POA
    • AND met CDC definition of HAP

NV-HAP SMCS Research Findings: 2010

24,482 patients and 94,247 patient days

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

Impact of NV-HAP in the ICU

HAPPI-2 Preliminary Data

- 23 hospitals in U.S.; 2014 data; 1306 total cases
  - 28% occurred in ICU
  - 26% occurred on Med/Surg units and were transferred to ICU
  - 54% of all NV-HAP cases spend some time in the ICU
  - 33% transferred to ICU died
  - 42% transferred to ICU survived but were discharged to a higher level of care; 25% home

Impact of NV-HAP on one year mortality:

- Any length of time spent in an ICU increases mortality of elderly patients who survive to discharge
ICU-Acquired pneumonia: VAP vs. NV-HAP

- **Methods**:
  - Prospective study of 135 consecutive episodes over 3 years of adults with ICU-acquired pneumonia
  - Compared clinical and microbiological characteristics of VAP and NV-HAP

- **Results** for VAP & NV-HAP were not statistically different:
  - Pathogens
  - Comorbid conditions,
  - Severity parameters,
  - Mortality, and
  - Hospital length of stay

- Among NV-HAP patients, 79 (52%) needed subsequent intubation

Where is the Highest Risk for NV-HAP?

Rate of Nonventilator Hospital-Acquired Pneumonia

NV-HAP per 1000 patient days

Slide courtesy of Barb Quinn
Preventing NV-HAP Through Evidence Based Fundamental Nursing Care Strategies
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

Micro Aspiration During Sleep in Healthy Subjects

- Prospective duplicate full-night studies
- 10 normal male’s 22-55 yrs of age
- Methods:
  - Radioactive $^{99}$mTc tracer inserted into the nasopharynx
  - Lung scans conducted immediately following final awakening
  - No difference in sleep efficacy between 2 study nights
- Results:
  - 50% of subjects had tracer in the pulmonary parenchyma upon final awakening
  - No difference in age, time spent in bed, efficacy of sleep, apnea-hypopnea index, arousal plus awakening index or % sleep in the supine position between subjects that aspirated and those that did not.

Procedure 4: Endotracheal Tube Care and Oral Care
Authors:
Kathleen M Vollman
Mary Lou Sole
Barbara Quinn
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
Formation of Biofilm Over 13 Hours

http://helios.bto.ed.ac.uk/bto/microbes/biofilm.htm
Loesche, W. 2012
Impact of Oral Care on HAP

FIGURE 2. Effects of oral care on preventing non-ventilator-associated pneumonia (non-VAP).

FIGURE 3. The effect of mechanical oral care on non-ventilator-associated pneumonia (non-VAP).

Current Evidence for Oral Care Procedure

• Method:
  – Review of 7 RCTs and 1 meta-analysis

• Results:
  – Toothbrushing removes dental plaque; swabs do not.
  – Chlorhexidine reduces oropharyngeal colonization
  – Chlorhexidine interventions reduce rate of VAP
  – Optimal frequency of basic oral care – unknown

Halm, A. Amer J Crit Care. 2009. 18, 275-278.
SMCS HAP Prevention Plan

Phase 1: 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</td>
<td>4 X / day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brush 1-2 minutes</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rinse</td>
<td></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</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brush gums, mouth</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rinse</td>
<td></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.

Used with permission from Barbara Quinn
NV-HAP Incidence
50 % Decrease from Baseline

Control chart for NV-HAP
January 2010 to December 2013

Open Heart Surgery Patients: NV-HAP Reduced 75%

Oral chlorhexidine periop started

Used with permission from Barbara Quinn
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

- 8 lives saved

PRICELESS

Patient Early Mobility
Mobility, Skin & Fall Prevention Strategies

Care Giver Risk

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

Immobility Risk

Skin Risk Factors

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

Mobility, Skin & Fall Prevention Strategies

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

Care Giver Risk

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

Consequences of Acute Illness and Immobility

Impact of Acute Illness

1. Muscle Strength
2. Hypo-perfusion
3. Delirium
4. Inflammation
5. Altered Thirst + Nutrition

Hazards of Bed Rest and Hospitalization

- Immobilization
- Barriers "Tether" Rx Diet
- Plasma Volume
- Ventilation
- Social Isolation
- Sedating Medications

Deconditioning
- Fall
- Syncope

Weakness
- Cognitive Impairment
- New or Exacerbated Organ Dysfunctions
- Psychological Problems

Increased Mortality Risk
- Inability to Return to Social Roles
- Recurrent Healthcare Needs
- Caregiving Burdens

Courtesy of Jack Iwashya
Oh, My Aching Back!

Back Pain Incidence in Nursing:

8 out of 10 nurses work despite experiencing musculoskeletal pain¹
62% of nurses report concern developing a disabling musculoskeletal injury¹
56% of nurses report musculoskeletal pain is made worse by their job¹
Nursing assistants had the 2nd highest and RNs had the 6th highest number of musculoskeletal disorders in the U.S.²

## What is the Incidence & Cost?

<table>
<thead>
<tr>
<th>Body Part</th>
<th>Incidence</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Back</td>
<td>51.3%</td>
<td>$8700 Avg</td>
</tr>
<tr>
<td>Shoulder</td>
<td>20.1%</td>
<td>$13,400 Avg</td>
</tr>
<tr>
<td>Wrist</td>
<td>6.7%</td>
<td></td>
</tr>
<tr>
<td>Arm</td>
<td>4.2%</td>
<td>$8500 Avg</td>
</tr>
<tr>
<td>Knee</td>
<td>4.0%</td>
<td>$11,300 Avg</td>
</tr>
<tr>
<td>Neck</td>
<td></td>
<td>$12,700 Avg</td>
</tr>
</tbody>
</table>

www.aon.com/wcbarometer 2016
Hospital Acquired Skin Injury

HAPU are the 4\textsuperscript{th} leading preventable medical error in the US
2.5 million patients are treated annually in Acute Care
NDNQI data base: \textbf{critical care: 7\%} med-surg: 1-3.3%
Acute care: 0-12\%, critical care: 3.3\% to 53.4\% (International Guidelines)
Most severe pressure injury: \textbf{sacrum (44.8\%)} or the \textbf{heels (24.2\%)}
60,000 persons die from pressure injury complications each yr.
National health care cost $11 billion annually

Whittington K, Briones R. \textit{Advances in Skin \\& Wound Care}. 2004;17:490-4.

\textbf{National Pressure Ulcer Advisory Panel, European Pressure Ulcer Advisory Panel and Pan Pacific Pressure Injury Alliance. Prevention \\& treatment of pressure ulcers :clinical practice guideline. Emily Haesler (Ed) Cambridge Media; Osborne Park; Western Austria;2014.}
Progressive Mobility Continuum

START HERE

Perform Initial mobility screen w/in 8 hours of ICU admission
Reassess mobility level at least every 24 hours
(Recommended at shift Δ)

Refer to the following criteria to assist in determining mobility level

- PaO2/FiO2 > 250
- Peep <10
- O2 Sat > 90%
- RR 10-30
- No new onset cardiac arrhythmias or ischemia
- HR >60 <120
- MAP >55 <140
- SBP >90 <180
- No new or increasing vasopressor infusion
- RASS > 3

NO

YEaS

Start at level I*
Start at level II and progress*

LEVEL I

RASS -5 to - 3
Goal: clinical stability; passive ROM

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

CLRT/Pronation initiated if patient meets criteria based on institutional practice OR Q 2 hr turning

LEVEL II

RASS -3 & up
Goal: upright sitting; increased strength and moves arm against gravity

ACTIVITY:
PT consultation prn
OT consultation prn

LEVEL III

RASS -1 & up
Goal: Increased trunk strength, moves leg against gravity and readiness to weight bear

ACTIVITY:
PT: Active Resistance
Once a day, strength exercises
OT consultation prn

LEVEL IV

RASS 0 & up
Goal: stands w/ min. to mod. assist, able to march in place, weight bear and transfer to chair

ACTIVITY:
PT x 2 daily
OT consult for ADL’s

LEVEL V

RASS 0 & up
Goal: Increase distance in ambulation & ability to perform some ADLs

ACTIVITY:
PT x 2 daily & OT x1 daily

For each position/activity change allow 5-10 minutes for equilibration before determining the patient is intolerant
***If the patient is intolerant of current mobility level activities, reassess and place in appropriate mobility level***

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

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

Thomsen GE, et al. CCM 2008;36;1119-1124
Winkelman C et al, CCN, 2010;30:36-60
Systematic Review of Early Rehabilitation in the ICU

14 studies/1753 patients
880 patients in intervention group
873 patient in control group
Varying methodologies

Results
No difference in short or long term mortality

Tipping CJ, et al. ICM, 2017;43:171-183
Results of Active Rehab

- ↑ muscle mass at ICU d/c
- ↑ probability of walking without assistance at hospital d/c
- ↑ more days alive and out of hospital 180 days

Limitations

- Variation in dosage, small sample sizes of individual studies
ASSESS, PREVENT & MANAGE PAIN

BOTH/SAT & SBT

CHOICE OF ANALGESIA & SEDATION

DELIRIUM

EARLY MOBILITY

FAMILY ENGAGEMENT & EMPOWERMENT


http://www.iculiberation.org/Bundles/Pages/default.aspx
ABCDEF Bundle: Improving Survival & Reducing Brain Dysfunction

Ventilated and non-ventilated medical and surgical ICU patients enrolled between January 1, 2014 and December 31, 2014

Determine association between ABCDEF bundle compliance/total & partial & outcomes of hospital survival and delirium-free and coma-free days/ adjusting for age, severity of illness, and presence of mechanical ventilation

Patients experienced more days alive and free of delirium and coma with both total bundle compliance (incident rate ratio, 1.02; 95% CI, 1.01–1.04; \( p = 0.004 \)) and partial bundle compliance (incident rate ratio, 1.15; 95% CI, 1.09–1.22; \( p < 0.001 \)).

10% ↑ in total bundle compliance, patients had a 7% higher odds of hospital survival

Barnes-Daly, MA, et. al. Crit Care Med, 2017;45:171-178
It Takes a Village for Sustainability

1. Necessary Components for Early Rehab
   - Buy-in
   - Multiple disciplines
   - Team communication
   - Opinion leader
   - Individual discipline champion
   - Dedicated rehab personnel
   - Equipment
   - Sedation practice
   - Administrative funding

2. Implementation Strategies
   - Team center approach
   - Staff education
   - Strength & quality of evidence

3. Perceived Barriers
   - Increased workload
   - Safety concerns

4. Positive Outcomes
   - Improved patient outcomes
   - Staff satisfaction
   - Changed culture
   - Financial savings

Early Mobility + Skin Prevention & Safe Patient Handling

In-Bed Mobility &
Out of Bed Mobility
Achieving the Use of the Evidence For In-Bed Mobility

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

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

Comparative Study of Two Methods of Turning & Positioning

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

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

1^a 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

<table>
<thead>
<tr>
<th>Patient Handling Injury and Costs</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>
</tr>
</thead>
<tbody>
<tr>
<td>Injuries/Cost</td>
<td>19/$427,500</td>
<td>8/$180,000</td>
<td>2/$45,000</td>
<td>5*/$112,500</td>
</tr>
</tbody>
</table>

Way H, Am JSPHM, 2016;6(4):160-165
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 for boosting/in-bed mobility: 4.78
- patient comfort: 4.54
- ease of integrating product into clinical workflow: 4.79
- impact on improving clinician safety: 4.86

Narrative comments included:
“With this procedure, a 100 pound nurse can boost a 300 pound patient; less strain on my back; used down in CT and it was fabulous.”

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

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

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

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

Early Mobility: Can We Do It? Is it Safe?
Safety

- > 1 % adverse events during 1449 sitting, standing and walking sessions with patients on ventilators.
- Underwent daily sedation interruption followed by PT & OT daily until achieving physical function independence
  - Safety events occurred in 16% of all sessions
    - Loss of 1 arterial line, 1 nasogastric tube, 1 rectal tube
    - Therapy was stopped on 4% of all sessions for vent asynchrony, agitation, or both
    - Delirium present 53% of the time during therapy sessions

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

Hemodynamic Instability

Is it a Barrier to Positioning?

50% reported in studies as the #1 patient barrier
The Role of Hemodynamic Instability in Positioning$^{1,2}$

- Lateral turn results in a 3%-9% decrease in SVO$_2$, 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 equilibrium

Decision-Making Tree for Patients Who Are Hemodynamically Unstable With Movement\textsuperscript{1,2}

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?
   - \(O_2\) 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

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

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

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

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

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

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

   - No
     - 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.

Evidence Based Strategies to Overcome Barriers

• Patient –related
  – Inclusion, exclusion criteria, protocols, research on specific equipment for safety (CCRT, etc.)

• Structural
  – Development and implementation of protocols, increase staffing & purchase of equipment

• ICU culture
  – Education, training, coaching, video’s, improve coordination between professionals

• Process related
  – Interprofessional meetings and rounds, sharing clinical responsibility, collaboration with champions, remove default orders

Cultural Adaptation to Increase Sustainability

Vollman KM, Bassett R. Transforming the Culture: The Key to Hardwiring Early Mobility & Safe Patient Handling. Amer Nurse Today, 2014, September
It is not enough to do your best; you must know what to do, and THEN do your best.

~ W. Edwards Deming
Driving Change

- Gap analysis
- Build the Will
- Protocol Development

Structure

- Make it Prescriptive
- Overcoming barriers
- Daily Integration

Process

Outcomes
Targeting to Zero!!!!
Be Courageous

We all are responsible for the safety of our patients......Own the Issues

• “If not this, then what??”
• “If not now, then when??”
• “If not me, then who??”