Do No Harm: Mitigating Risk Factors for Ventilator Associated and Non-Ventilator Associated Pneumonia

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Disclosures

• Consultant-Michigan Hospital Association Keystone Center
• Consultant/Faculty for CUSP for MVP—AHRQ funded national study
• Subject matter expert for CAUTI, CALBSI, CDI, Sepsis, HAPI and culture of Safety for HIIN/CMS
• Consultant and speaker bureau for Sage Products, a business unit of Stryker
• Consultant and speaker bureau for Eloquest Healthcare
Objectives

• Identify the importance for addressing both VAP and non-vent pneumonia

• Define key evidence based nursing care practices that reduce VAP & non-vent HAP

• Discuss strategies to overcome barriers
Notes on Hospitals: 1859

• “It may seem a strange principle to enunciate as the very first requirement in a Hospital that it should do the sick no harm.”
  - Florence Nightingale

Advocacy = Safety
Protect The Patient From Bad Things Happening on Your Watch

Implement Interventional Patient Hygiene
Interventional Patient Hygiene

• Hygiene…the science and practice of the establishment and maintenance of health

• Interventional Patient Hygiene….nursing action plan directly focused on fortifying the patient’s host defense through proactive use of evidence-based hygiene care strategies
Interventional Patient Hygiene (IPH)

Achieving the Use of the Evidence

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

The Why
VAP

• VAP is associated with ↑ MV days and ↑ ICU & hospital LOS

• Attributable mortality estimated to be 4.0–13.5%

• Financial cost of a VAP episode has been estimated as approximately $20,000 to $40,000
Building Blocks to Best Practice in Caring for Mechanically Ventilated Patients

**Ventilator Bundle:** HOB 30, Deep Vein Thrombosis (DVT) prophylaxis, Peptic Ulcer Disease (PUD) prophylaxis, Sedation interruption, Spontaneous breathing trial, daily care with chlorhexidine

**VAP Bundle:** HOB 30, Sedation interruption, Spontaneous breathing trial, oral care 6x per day, CHG rinse 2x per day, subglottic secretions drainage if expected to be ventilated > 72hrs

Impact of a New Bundle/2 State Collaborative

- 38 hospitals, 56 ICU’s in 2 states from October 2012 to March 2015
- Evidence based interventions, teamwork & safety culture
- Head-of-bed elevation, use of subglottic secretion drainage endotracheal tubes, oral care, chlorhexidine mouth care, and daily spontaneous awakening and breathing trials.


- VAE: 7.34 to 4.58 cases per 1,000 ventilator-days \( (p = 0.007) \)
- IVAC 3.15 to 1.56 per 1,000 ventilator days \( (p = 0.018) \)
- PVAP 1.41 to 0.31 cases per 1,000 ventilator-days \( (p = 0.012) \)
Risk Factor Categories for Hospital Acquired Pneumonia

• Factors that increase bacterial burden or colonization

• Factors that increase risk of aspiration
Comprehensive Oral Care
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 VAPs 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
This attachment structure requires mechanical removal with a good toothbrush.
What Does the Evidence Tell Us?

Brush
CHG rinse alone
CHG rinse in combination
Swab/Clean/Moisturize
Suction

All of the above

Comprehensive Oral Care Program
Literature Review: Oral Care Impact of VAP

**Comprehensive Oral Care:**

- Reduction in VAP from 5.6 to 2.2 (Schleder B. et al. J Advocate Health 2002;4(1):27-30)


- Reduction in VAP from 12.0 to 8.0 (p=.060) with 80% compliance, vent bundle already being preformed, 1538 patients randomized to control or study group. Additional outcomes: ↓ vent days (p=.05), ↓ ICU LOS (p=.05), ↓ time to VAP (p<.001), & reduction in mortality (p=.05) (Garcia R et al AJCC, 2009;18:523-534)
## Risk Reduction of VAP with Oral Antisepsis: A Systematic Review & Meta-analysis

<table>
<thead>
<tr>
<th>Study</th>
<th>Antisepsis</th>
<th>Control</th>
<th>Weight</th>
<th>Risk Ratio 95% CI</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labaeu et al.</td>
<td>6/21</td>
<td>2/20</td>
<td>0.03</td>
<td>0.45 (0.22-0.93)</td>
<td>0.004</td>
</tr>
<tr>
<td>Segal et al.</td>
<td>3/5</td>
<td>0/2</td>
<td>0.2</td>
<td>0.50 (0.12-1.97)</td>
<td>0.32</td>
</tr>
<tr>
<td>Villar et al.</td>
<td>7/30</td>
<td>2/24</td>
<td>0.13</td>
<td>0.41 (0.18-0.91)</td>
<td>0.03</td>
</tr>
</tbody>
</table>

Total events: 9/90

Heterogeneity: P=0.016, I²=51%

Test for overall effect: Z=2.07, p=0.04

- **P = 0.004**

---

- **P = 0.14**
Impact of Oral CHG on Frequency of VAP

Villar CC, Respiratory Care, 2016 Sep;61(9):1245-59.
Literature Review: Oral Care Impact of VAP

Comprehensive Oral Care & CHG:

- Reduction in VAP to zero for 2 years, vent bundle, mobility, oral care & CHG with comprehensive education performed (Murray TM et al. AACN Advanced Critical Care. 2007;18(2):190-199)

Dickinson S et al. SCCM Critical Connections, 02/2008
Type of Oral Care Impacted on VAP

- Multi-center prospective RCT (6 month trial)
- 1716 admitted to the ICUs; 219 fulfilled the criteria for inclusion and 213 were analyzed
- 108 were randomized to control group and 105 to intervention group (Tooth brushing with 0.12% CHG or 0.12% CHG alone q 12 hrs)
- Examine impact on VAP, time on vent & LOS
It is Not Just About the Oral CHG
It is about Manual Cleaning and Frequency of oral care
Oral care compliance & use of the ventilator bundle resulted in a 89.7% reduction in VAP

Impact of a New Bundle/2 State Collaborative

- 38 hospitals, 56 ICU’s in 2 states from October 2012 to March 2015
- Evidence based interventions, teamwork & safety culture
- Head-of-bed elevation, use of subglottic secretion drainage endotracheal tubes, oral care, chlorhexidine mouth care, and daily spontaneous awakening and breathing trials.

- VAE: 7.34 to 4.58 cases per 1,000 ventilator-days ($p = 0.007$)
- IVAC 3.15 to 1.56 per 1,000 ventilator days ($p = 0.018$)
- PVAP 1.41 to 0.31 cases per 1,000 ventilator-days ($p = 0.012$)
TRUST THE PROCESS
Non-Vent Pneumonia: Addressing Risk Factors

Some slides courtesy of Barb Quinn
Build the Will: NV-HAP?

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

## Relative Harm: Most Common HAIs

<table>
<thead>
<tr>
<th>Type</th>
<th>% Prevalence</th>
<th>% Mortality</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTI</td>
<td>13%</td>
<td>1.5%</td>
<td>$1,108</td>
</tr>
<tr>
<td>CLABSI</td>
<td>5-10%</td>
<td>12%</td>
<td>$33,618</td>
</tr>
<tr>
<td>SSI</td>
<td>22%</td>
<td>3%</td>
<td>$19,305</td>
</tr>
<tr>
<td>HAP</td>
<td>22%</td>
<td>19%</td>
<td>$40,000</td>
</tr>
</tbody>
</table>

Current Literature:
NV-HAP is a National Problem in Hospitals

<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)</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>Magill et al. CDC (2014)</td>
<td>13% of all HAIs</td>
<td>19%</td>
<td>4-9 days</td>
<td>$40,000</td>
</tr>
<tr>
<td>Micek, Chew, Hamptom &amp; Kollef (2016)</td>
<td>Matched controls 174 cases NV-HAP</td>
<td>15.5%vs. 1.6%</td>
<td>8.4 more likely to die</td>
<td>15.9 days vs. 4.4</td>
</tr>
<tr>
<td>See, et al. (2016).</td>
<td>Retrospective review 8 hospitals in PA 2011-2012 VAP excluded</td>
<td>30.9%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Davis, Pt Safety Authority 2012 9(3).
Giuliano, K. et al. (2016) AORN Poster 2016
Magill, S.S. et.al. (2014) NEJM. 370(13), p 1198-1208
Micek, et al. CHEST 2016 Online first
See, et al. ICHE, 37, pp 818-824 doi:10.1017/ice.2016.74
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 1. Pennsylvania Nosocomial Pneumonia and Related Deaths

<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>8.7 (95% CI: 17.5 to 19.8)</td>
<td>2,299</td>
<td>434</td>
<td>18.9 (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

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
- 1,035 extra days

HAPPI-2 Incidence of Non-Ventilator Hospital-Acquired Pneumonia

• Multicenter retrospective chart review

• Extracted NV-HAP cases per the 2014 ICD-9-CM codes for pneumonia not POA and the 2013 CDC case definition

• 21 hospitals completed data collection

• Measured nursing care missed 24hrs before diagnosis

• Non-vent HAP occurred on every unit
HAPPI-2 Incidence of Non-Ventilator Hospital-Acquired Pneumonia

Missed nursing care 24 hours prior to Non-Vent HAP dx.

Baker D, Quinn B, Amer J of Infect Control, 2018;46:2-7
HAPPI-2 Incidence of Non-Vent Hospital-Acquired Pneumonia

Results:
• 1,300 NV-HAP (0.12-2.28 per 1,000 pt days)
  • 18.4% mortality
  • 50% < 66 yrs old
  • 63% non-surgical
  • 70.8% outside the ICU
  • 27.3% in ICU
  • 18.8% transferred to ICU
  • 37.3% LOS >20 days
  • 57.7% LOS > 15 days
  • 40.6% admitted from home were discharged back to home
  • 19.3% readmitted within 30 days
  • $36.4 - $52.56 million in extra costs

Baker D, Quinn B, Amer J of Infect Control, 2018;46:2-7
Epidemiology of Non-Ventilator Hospital Acquired Pneumonia in US

- The 2012 US national inpatient sample dataset was used to compare an NV-HAP group to 4 additional group cohorts:
  - Pneumonia on admission
  - General hospital admissions
  - Matched on mortality & disease severity
  - Ventilator-associated pneumonia (VAP)

- Secondary outcome: compare HLOS, total hospital charges, and mortality between the NV-HAP group and the 4 I group cohorts
Epidemiology of Non-Ventilator Hospital Acquired Pneumonia in US

• Incidence of NV-HAP was 1.6%, (3.63 per 1,000 pt days)
• NV-HAP was associated with:
  - Increased total hospital charges
  - Longer hospital length of stay
  - Greater likelihood of death

Compared to all groups except patients with VAP
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
Not On Your Dashboard Yet?
Preventing NV-HAP Addresses Common Quality Metrics

- Mortality: 18.4%
- ICU utilization: 66%
- Length of stay: 4-9 extra days
- 30 day Readmission: 19.3%
- Long term morbidity: 34% d/c LTC
- Sepsis: >50% of all HAP
- Cost: $28K-$40K
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

Formation of Biofilm Over 13 Hours

Loesch, W. 2012
http://helios.bto.ed.ac.uk/bto/microbes/biofilm.htm
Role of Salivary Flow

- Provides mechanical removal of plaque and microorganisms
- Innate & specific immune components (IgA, cortisol, lactoferrin)
- Patients receiving mechanical ventilation have dry mouth which in turn contributes to accumulation of plaque & reduced distribution of salivary immune factors
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 males 22-55 yrs of age
- Methods:
  - Radioactive 99mTc 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

Body Position: Supine versus Semi-recumbent (30-45 degrees)

Methodology

• 19 mechanically ventilated patients
• 2 period crossover trial
• Study supine and semirecumbent positions over 2 days
• Labeled gastric contents (Tc 99m sulphur colloid)
• Measured q 30 min content of gastric secretions in endobronchial tree in each position
• Sampled ET secretions, gastric juice & pharyngeal contents for bacteria
Body Position: 
Supine versus Semi-recumbent (30-45 degrees)

Results

• Radioactive contents higher in endobronchial secretions in supine patients

• Time dependent:
  - Supine: 298cpm/30min vs. 2592cpm/300min
  - HOB: 103cpm/30min vs. 216cpm/300min

• Same microbes cultured in all 3 areas 32% with HOB vs. 68% supine

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 2. Elements of Nursing Care by Ability of Patient to Report and Extent Missed***

<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>Mouth care&lt;br&gt;Listening&lt;br&gt;Being kept informed</td>
<td>Ambulation&lt;br&gt;Discharge planning&lt;br&gt;Patient education</td>
<td>Patient assessment&lt;br&gt;Surveillance&lt;br&gt;IV site care</td>
</tr>
<tr>
<td>Sometimes Missed</td>
<td>Response to call lights&lt;br&gt;Response to alarms&lt;br&gt;Meal assistance&lt;br&gt;Pain medication and follow-up</td>
<td>Medication administration&lt;br&gt;Repositioning</td>
<td></td>
</tr>
<tr>
<td>Rarely Missed</td>
<td>Bathing</td>
<td>Vital signs&lt;br&gt;Hand washing</td>
<td></td>
</tr>
</tbody>
</table>

* IV, intravenous.
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

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).

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
# Use of the Influencer Model

<table>
<thead>
<tr>
<th>Influencer Model</th>
<th>Motivation</th>
<th>Ability</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.Vitalsmarts.com">www.Vitalsmarts.com</a></td>
<td>Patient stories</td>
<td>Education</td>
</tr>
<tr>
<td>Personal</td>
<td>Compare units</td>
<td>Mentor peers</td>
</tr>
<tr>
<td>Social</td>
<td>Measure Recognize</td>
<td>Tools</td>
</tr>
<tr>
<td>Structural</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## 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>4X / day</td>
</tr>
<tr>
<td>Dependent / Aspiration Risk</td>
<td>Suction toothbrush kit (4)</td>
<td>Package instructions</td>
<td>4X / day</td>
</tr>
<tr>
<td>Dependent / Vent</td>
<td>ICU Suction toothbrush kit (6)</td>
<td>Package instructions</td>
<td>6X / 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.

Used with permission from Barbara Quinn
Oral Care Knowledge & Attitude Survey:

• Method:
  - Staff survey
  - Pre – Post education

• Results:
  - Awareness of oral care protocol (77%)
  - Priority of care for NAs (96%)
  - RN perception that their patients received oral care (300%)
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
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

NV-HAP ↓ 70% from baseline!

Control chart for non-ventilator HAP
January 2010 to December 2014

- Oral care for all adult pts
- Documentation
- NGT standards revised
- Pharmacy starts PPI protocol
- Started oral care prior to
- Mandatory Education for Nurse Assistants

Quinn B, Presented at AACN NTI, Houston, Tx, 2017
Post-Operative NV-HAP (all adult inpatient surgery) Incidence 6 months Pre Oral Care vs. 6 Months After

Quinn B, Presented at AACN NTI, Houston, Tx, 2017
Nurse Driven Oral Care Protocol to Improve NV-HAP

• QI project, 650 bed level 1 trauma center
• Data measure retrospectively/prospectively using ICD 9 & 10 codes not POA for NV-HAP and VAP
• 7 months baseline, 7 months intervention
• Method:
  • Evaluated current practice, the literature and oral care supplies
  • Pilot program with new oral care protocols/supplies for self care, assisted oral care and ventilator oral care
  • Expanded to whole hospital post pilot area

Warren C et al. AJN 2019;119(2):44-51
Results

- Staff adherence to protocol 76% (36%-100%)
- NV-HAP
  - Baseline: 202 charts/52 NV-HAP’s-20 deaths
  - Post: 215 charts/26 NV-HAP’s (p< 0.0001)-4 deaths
- VAP
  - Baseline: 56 VAE’s/ 12 VAP’s (2.87 per 1000 vent days)
  - Post: 49 VAE’s/3 VAP’s (1.26 per 1000 vent days)

50% reduction in NV-HAP, avoided 16 deaths & 1.4 million dollars

Warren C et al. AJN 2019;119(2):44-51
Building Blocks to Best Practice in Caring for Mechanically Ventilated Patients

**Ventilator Bundle:** HOB 30, Deep Vein Thrombosis (DVT) prophylaxis, Peptic Ulcer Disease (PUD) prophylaxis, Sedation interruption, Spontaneous breathing trial, daily care with chlorhexidine

**VAP Bundle:** HOB 30, Sedation interruption, Spontaneous breathing trial, oral care 6x per day, CHG rinse 2x per day, subglottic secretions drainage if expected to be ventilated > 72hrs

**ABCDE Bundle:** Assess & manage pain, Both Spontaneous awakening trial (SAT) & spontaneous Breathing trial(SBT), Choice of Sedation, Delirium Assessment and management, Early Mobility, Family and Patient Engagement

http://www.ihi.org/resources/Pages/Tools/HowtoGuidePreventVAP.aspx
www.ICUliteration.org
ASSESS, PREVENT & MANAGE PAIN

BOTH SAT & SBT

CHOICE OF SEDATION

DELIRIUM

EARLY MOBILITY

FAMILY/PATIENT ENGAGEMENT
It is not enough to do your best; you must know what to do, and THEN do your best.

~ W. Edwards Deming
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?”