The Blinders are Off: Strategies for Preventing the #1 Hospital Acquired Infection: Non-Vented Pneumonia

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Disclosures

- Sage Products
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- Eloquest Healthcare
- Hill-Rom

Some Slides Courtesy of Barb Quinn
Session Objectives

• Create the link of patient advocacy to the basic nursing care
• Define key fundamental evidence based nursing care practices that reduce harm
• 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
Advocacy Starts with Us

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

INTERVENTIONAL PATIENT HYGIENE (IPH)

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

Achieving the Use of the Evidence

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

Value
Attitude
& Accountability

Skills & Knowledge
Resources & System

Attitude
& Accountability


Why HAI's? Protecting Patients From Harm

Estimates: 183 Hospitals in 10 States

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td>HAI</td>
<td>722,000/year</td>
</tr>
<tr>
<td>HAI-related deaths</td>
<td>75,000/year</td>
</tr>
<tr>
<td>Hospitalized patients</td>
<td>1 out of 25 (4%)</td>
</tr>
<tr>
<td>Death due to sepsis/septic shock</td>
<td>700/day</td>
</tr>
<tr>
<td>Money spent</td>
<td>$45 billion/year</td>
</tr>
<tr>
<td>Increase risk of readmission</td>
<td>27days vs. 59 days</td>
</tr>
</tbody>
</table>

### Health Care Associated Infection Data

<table>
<thead>
<tr>
<th>Measurement</th>
<th>NHSN 2012</th>
<th>Estimated # of Infections</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3742 hospitals in US</td>
<td></td>
</tr>
<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</td>
<td>49,900</td>
</tr>
<tr>
<td></td>
<td>0.2 (Ped CVICU) -4.4 (Burn ICU)</td>
<td></td>
</tr>
<tr>
<td>CLA-BSI/per 1000 cath days</td>
<td>Range of pooled means</td>
<td>15,600</td>
</tr>
<tr>
<td></td>
<td>0.8 (CVICU)-3.4 (Burn ICU)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Step-down-Ward 0.3 (Adult Rehab)-2.4 (Burn)</td>
<td></td>
</tr>
<tr>
<td>CA-UTI/per 1000 cath days</td>
<td>Range of pooled means</td>
<td>35,600</td>
</tr>
<tr>
<td></td>
<td>0.7 (Peds Surgical)-5.0 (Neuro ICU)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.0 (Well Baby) – 4.1 (Peds rehab)</td>
<td></td>
</tr>
</tbody>
</table>


– 75% of HAI not related to devices (CAUTI, CLABSI, VAP)

- Recommendation:
  - As device-related infections decrease, expand surveillance and prevention activities to include other HAIs

## Improvement Seen Except CAUTI’s

- 44% ↓ in CLABSI’s between 2008-2012
- 20% ↓ in infections for 10 surgical procedures between 2008-2012
- 4% reduction in MRSA bacteremia’s 2011-2012
- 2% reduction in C-Diff between 2011-2012
- 3% ↑ in CAUTI’s 2009-2012


## Definition: Hospital-Acquired Pneumonia

- Hospital-acquired pneumonia (HAP)
  - 48 hours
  - Meets algorithm of criteria (CDC, 2003)

- Types of HAP
  - VAP
  - NV-HAP
  - Post op pneumonia

ATS (2005)
CDC (2003)
Why 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
- Understudied, under-addressed
- Focus has been on the other HAP → VAP
  - Surveillance not required….yet

Pennsylvania Dept. of Public Health (2010)

Non-Device HAI’s-Single Center Study

• Purpose:
  - Examine HAI rates over time
• Method
  - 5 years of HAI data
  - 806-bed tertiary care facility
• Results
  - Device-related HAI decreased
  - Non device related unchanged

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>NV-HAP Cases</th>
<th>NV-HAP Deaths</th>
<th>% of NV-HAP Cases Contributing to Death</th>
<th>VAP Cases</th>
<th>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: 15.1 to 20.9)</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>19.0 (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>19.7 (95% CI: 17.5 to 20.9)</td>
<td>2,299</td>
<td>434</td>
<td>19.0 (95% CI: 17.1 to 20.7)</td>
</tr>
</tbody>
</table>

• 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


Results

- 24,482 patients and 94,247 patient days
- 115 cases of NV-HAP
- Total estimated annual effect of NV-HAP:
  - $4.6 million
  - 23 deaths
  - 1035 days

Missed Nursing Care*

- Elevated HOB
- Mobility
- Oral Care
- IS/C&DB


**NV-HAP Study #1: Conclusions**

- HAP is occurring in nonventilated patients
- Costing lives and dollars
- Patients are at risk on ALL units
- Preventative nursing care is missed
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
Prevention

Germs in Mouth
• Comprehensive oral care

Aspirated
• Aspiration prevention strategies

Weak Host
• Strengthen host defenses

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 VAPs' causative organism was identical via DNA analysis

- 49 elderly nursing home residents admitted to the hospital
- Examined baseline dental plaque scores & microorganisms 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.html
Loesche, W. 2012
Oral Care Reduces Pneumonia In Nursing Homes

Method:
- 11 nursing homes in Japan over 2 year period
- 184 received oral care program/182 did not
- Tooth brushing after each meal (teeth or dentures) & 1x weekly review by dentist/or hygienist

Results:

<table>
<thead>
<tr>
<th></th>
<th>No Oral</th>
<th>Oral Care</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Febrile</td>
<td>29%</td>
<td>15%</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>19%</td>
<td>11%</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Death</td>
<td>16%</td>
<td>7%</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>MMSE</td>
<td></td>
<td>Increase</td>
<td>&lt;.05</td>
</tr>
</tbody>
</table>


Oral Care Reduces Pneumonia In Nursing Home Residents

- Improves swallowing and cough reflex sensitivities

Oral Intensity: Reducing NV-HAP in Neuro Impaired Patients

• Method
  – Quasi-experimental, comparative study
  – Adults, acute Neuroscience unit Western Canada
  – 51 retrospective patients – standard oral care
  – 34 prospective patients – enhanced oral care

• Results
  – Statistically significant decrease in NV-HAP (p<0.05)


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.
Phase 2: Could NV-HAP be decreased simply brushing the patient’s teeth?

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><strong>Personal</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Social</strong></td>
<td>Compare units</td>
<td>Mentor peers</td>
</tr>
<tr>
<td><strong>Structural</strong></td>
<td>Measure Recognize</td>
<td>Tools</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</td>
<td>4 X / day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brush 1-2 minutes 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>4X / day</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Brush gums, mouth Rinse</td>
<td></td>
</tr>
</tbody>
</table>

## SMCS NV-HAP Prevention

Patient and family education part of daily nursing care

Did You Know

The best way to prevent pneumonia is through good oral care. Sutter Medical Center, Sacramento is working to reduce the number of infections through effective use of new oral care tools.

- Toothpaste with baking soda that removes plaque
- Antiseptic oral rinse that kills germs that cause pneumonia
- A soft toothbrush that won’t harm sensitive gums

Our nursing staff are working to educate patients and families about the proper methods to prevent pneumonia.

For more information, please contact a Nurse Director on any patient unit.
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

- 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%)
Frequency of Oral Care: Increased in the ICU

Mean Frequency of Oral Care in Relationship to NV- HAP

Frequency of Oral Care for Non-vented patients in the ICU ↑ 300%
Oral Care Frequency Per 24 Hours – All Units

X-bar chart mean oral care May, 2012 through December, 2013 (excludes months with < 10 cases)

Mean Oral Care

Oral Care Frequency Per 24 Hours – All Units

X-bar chart mean oral care May, 2012 through December, 2013 (excludes months with < 10 cases)

Baseline

Mean Oral Care

NV-HAP Incidence
50 % Decrease from Baseline

Control chart for NV-HAP
January 2010 to December 2013

Baseline

Oral Care

Number of non-ventilator HAP cases

Month/Year

UCL

LCL

Average

Baseline

Oral Care
Open Heart Surgery Patients: NV-HAP Reduced 75%

Rate of NV-HAP 2010-2013
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

Control chart for non-ventilator HAP
January 2010 to June 2014
WHEN WOULD NOW BE A GOOD TIME TO DO THIS?

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

~ W. Edwards Deming

Back to The Basics!!!!

How to Get Started
Interventions To Ensure Patients Receive Evidence-Based Care

- Evidence based education
- Recognition of value and reinforcement
- Products/Processes that make it easy for the frontline caregiver to provide the care (make it part of the bundle)
  - Bathing kits
  - Oral care kits
  - Placement on the med record
  - Automated charting with flag reminders
- Frequent rounding/reinforcement of standard
- Multidisciplinary rounds/Checklists

Westwall S. Nursing in Critical Care, 2008;13(4):203-207
Abbott CA, et al. Worldviews on Evidence Based Practice, 2006:139-152

Interventions To Ensure Patients Receive Evidence-Based Care

- Setting targets/Celebrating successes
- Placement of new practice/education in orientation
- Attractive signs to outline protocol in the patient rooms near the products
- Compliance program with feedback to all caregivers
- Outcome measurement/Feedback*

Westwall S. Nursing in Critical Care, 2008;13(4):203-207
Abbott CA, et al. Worldviews on Evidence Based Practice, 2006:139-152
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.