It is More than Just Tasks: Achieving Sustainable Reductions in Non-Vented HAP’s by Connecting Basic Care to Nursing’s Advocacy Role

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Disclosures

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

- Create the link of patient advocacy to the basic nursing care
- Define key fundamental evidence based nursing care practice that reduces non-vented 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 patients host defense through proactive use of evidence based hygiene care strategies

Incontinence Associated Dermatitis Prevention Program

Hand Hygiene
Comprehensive Oral Care Plan
Catheter Care
Bathing & Assessment
Pressure Ulcer Prevention
INTERVENTIONAL PATIENT HYGIENE (IPH)

- VAP/HAP
- Oral Care/Mobility
- HAND
- Patient
- 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

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

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>Frequentely Missed</th>
<th>Fully Reportable</th>
<th>Partially Reportable</th>
<th>Not Reportable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mouth care</td>
<td>Ambulation</td>
<td></td>
<td>Patient assessment</td>
</tr>
<tr>
<td>Listening</td>
<td>Discharge planning</td>
<td></td>
<td>Surveillance</td>
</tr>
<tr>
<td>Being kept informed</td>
<td>Patient education</td>
<td></td>
<td>IV site care</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sometimes Missed</th>
<th></th>
<th>Medication administration</th>
<th>Repositioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response to call lights</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Response to alarms</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meal assistance</td>
<td></td>
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</tr>
</tbody>
</table>

| Rarely Missed | Bathing | Vital signs | Hand washing |

* 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

# Health Care Associated Infection Data

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


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# Preventing NV-HAP Through Evidence Based Fundamental Nursing Care Strategies & Do No Harm
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?: DO NO HARM

- 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

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)


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


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

### Hap ICD-9 Codes

<table>
<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>480.8</td>
</tr>
<tr>
<td>481</td>
</tr>
<tr>
<td>482</td>
</tr>
<tr>
<td>482.1</td>
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<td>482.2</td>
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<tr>
<td>482.39</td>
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<td>482.41</td>
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<td>482.42</td>
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<td>482.82</td>
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<tr>
<td>482.83</td>
</tr>
<tr>
<td>482.89</td>
</tr>
<tr>
<td>483.8</td>
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<tr>
<td>484.1</td>
</tr>
<tr>
<td>484.6</td>
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<td>484.7</td>
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<tr>
<td>485</td>
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<tr>
<td>486</td>
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</tbody>
</table>

### 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

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NV-HAP SMCS Research Findings: 2010

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%)

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

Healthcare Acquired Pneumonia

- Risk Factor Categories
  - Factors that increase bacterial burden or colonization
  - Factors that increase risk of aspiration

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.

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


Maintenance Of Oral Health

- Systemic health through prevention of aspiration pneumonia & blood borne infections
- Adequate nutritional intake
- Quality of life
- Well-being

The Older Adult At Risk

- Cognitively impaired
- Diminished swallow and cough reflex
- Functionally dependant
- Dry mouth
- Multiple medications
- High rate tooth decay
- Behavioral problems during oral hygiene

Oral Cavity Response to Disease and Insult

Mobilizes defense to maintain integrity & function

If initial defense fails, the oral cavity shifts to resisting the invasions impact

If resistance fails (seen in older adults at risk) the oral cavity succumbs

- Infection
- Bleeding & Inflammation
- Pain
- Difficulty
- Eating & Communicating
**Significant Independent Predictors of Aspiration Pneumonia**

- Dependant for feeding
- Dependant for oral care
- Number of decayed teeth
- Tube feeding
- Multiple medical diagnoses
- Number of medications
- Dry mouth
- Smoking


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**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


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- 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

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

Munro CL & Grap MJ. AJCC. 2004;13:25-34
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*

Comprehensive oral care reduces rate of VAP**

**Garcia R et al AJCC, 2009;18:523-534

Prevention of VAP with Oral Antisepsis: A Systematic Review & Meta-analysis

- 17 studies evaluated from 1996-2014
- 4249 patients
- All randomize trials
- 15 trails assessed the effectiveness of CHG (51% were CABG pts)
- 2 trials evaluated Povidone-iodine (140pts)
- No difference in morality, LOS or VFD
- Variation of additional interventions;*
  - toothbrushing,
  - oropharyngeal aspiration
  - mechanical cleaning of the mouth
  - Frequency of antiseptic

ICU Oral Care Studies

- Before & after design
- Comprehensive oral care
- Comprehensive defined: Q 2-4hr cleansing, suctioning and moisturizing, brushing twice a day with or without CHG & deep oral cleansing q6hrs
- Results:
  - Reduction in VAP rates from 63% to 100%
  - Protocol variation is significant


Does Compliance Make A Difference?

Oral care compliance & use of the ventilator bundle resulted in a 89.7% reduction in VAP

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

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</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 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.
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
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

Baseline

NV-HAP Incidence
50 % Decrease from Baseline

Control chart for NV-HAP
January 2010 to December 2013

Number of non-ventilator HAP cases

Month/Year

Baseline

Oral Care

Average

UCL

LCL

LCL

Average

Baseline
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

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

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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.