Interventional Patient Hygiene: Impacting Patient Outcomes by Implementing Evidence Based Nursing Care Interventions

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Some Slides Courtesy of Barb Quinn
Disclosures for Kathleen Vollman

- Consultant-Michigan Hospital Association Keystone Center
- Consultant/Faculty for CUSP for MVP—AHRQ funded national study
- Subject matter expert CAUTI, CLABSI, HAPU, Sepsis, Safety culture
- 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 reduce bacteria burden on the patient

• 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

Comprehensive Oral Care Plan

Hand Hygiene

Catheter Care

Bathing & Assessment

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

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

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>develop infection:</td>
<td></td>
</tr>
<tr>
<td>Death due to</td>
<td>700/day</td>
</tr>
<tr>
<td>sepsis/septic shock:</td>
<td></td>
</tr>
<tr>
<td>Money spent:</td>
<td>$45 billion/year</td>
</tr>
<tr>
<td>Increase risk of</td>
<td>27days vs. 59 days</td>
</tr>
<tr>
<td>readmission:</td>
<td></td>
</tr>
</tbody>
</table>

# Health Care Associated Infection Data

<table>
<thead>
<tr>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>HAP/per 1000 patient days</td>
<td></td>
<td></td>
<td>157,500 (21.8%)</td>
</tr>
<tr>
<td>VAP/per 1000 vent days</td>
<td>0.8 per 1000 vent days 0.2 (Ped CVICU) -4.4 (Burn ICU) (2012) data</td>
<td>13.1 per 1000 vent days</td>
<td>49,900</td>
</tr>
<tr>
<td>CLA-BSI/per 1000 cath days</td>
<td>Range of pooled means 0.8 (CVICU)-2.9 (Burn ICU)</td>
<td>4.1 per 1,000 central line-days</td>
<td>15,600</td>
</tr>
<tr>
<td>CA-UTI/per 1000 cath days</td>
<td>1.7 per 1000 catheter days 0.0 (Peds Surgical)-4.8 (Burn ICU)</td>
<td>5.07 per 1000 catheter days</td>
<td>35,600</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 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><strong>Frequently Missed</strong></td>
<td>Mouth care, Listening, Being kept informed</td>
<td>Ambulation, Discharge planning, Patient education</td>
<td></td>
</tr>
<tr>
<td><strong>Sometimes Missed</strong></td>
<td>Response to call lights, Response to alarms, Meal assistance, Pain medication and follow-up</td>
<td>Medication administration, Repositioning</td>
<td></td>
</tr>
<tr>
<td><strong>Rarely Missed</strong></td>
<td>Bathing</td>
<td>Vital signs, Hand washing</td>
<td></td>
</tr>
</tbody>
</table>

* IV, intravenous.

Source Control: The Oral Cavity as a Risk Factor in NV-HAP and VAP
AACN Procedural Manual-6th ed

Procedure 4: Endotracheal Tube Care and Oral Care

Authors:
Kathleen M Vollman
Mary Lou Sole
Barbara Quinn
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
  - Hospital length of stay

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

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


Slide courtesy of Barb Quinn
## 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>

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

Slide courtesy of Barb Quinn
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>18.7 (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

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

Where is the Highest Risk for NVHAP?

![Bar graph showing the rate of Nonventilator Hospital-Acquired Pneumonia (NV-HAP) per 1000 patient days for different departments: Vent, Med/Surg, and NV-ICU. NV-ICU has the highest rate, followed by Med/Surg and Vent.]
Reducing Risk of VAP & 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

Healthcare Acquired Pneumonia

• Risk Factor Categories
  – Factors that increase bacterial burden or colonization
  – Factors that increase risk of aspiration
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-hyponea 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.

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


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
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)

Impact of Oral Care on HAP

New VAP Prevention Bundle

- Extensive review of literature/guidelines
- Used a 2-step Delphi process
- 65 possible intervention-narrowed to 5 process and 14 structural
Comprehensive Oral Care Protocol: The Good Shepherd Study

Methodology:

- Retrospective study 10 bed Med-Surg
- Protocol included: Covered Yankauer for non-traumatic oral suctioning, soft-suction toothbrush, Suction Oral Swab, use of a 1.5% H₂O₂ peroxide mouth rinse for cleansing, deep oral suction catheter used 4x daily, dedicated oral suction line for infection control and ease of use.
- Education provided and presence of clinical champion.

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 4.10 (2005) to (2.15) in 2006 with addition of CPC & comprehensive oral care. Vent bundle & rotational therapy already being performed

- 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)
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 preformed (Murray TM et al. AACN Advanced Critical Care. 2007;18(2):190-199)

Dickinson S et al. SCCM Critical Connections, 02/2008

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

Phase 2:
Could NV-HAP be decreased simply by 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

## 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>4X / day</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>

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
Frequency of Oral Care: Increased in the ICU

Frequency of Oral Care for Non-vented patients in the ICU ↑ 300%

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%

4N OHS

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

HAP Significant Trend Downward
Jan 2010-June 2014

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

Used with permission from Barbara Quinn
Making it Happen: Comprehensive Oral Care with and Antiseptic

- Create visual cues to show evidence of compliance
- Date and time the oral care kits
- Assign product change over to one shift
- Include oral care/more than CHG in order sets and on documentation
- Teach family and patient how to perform
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
Evidence Based
Bathing Practices
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

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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

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

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

Total hospitals: 88
Total basins: 1103

- Contaminated: 62%
  686 basins/88 hospitals

- Gram negative bacilli: 45%
  495 basins/86 hospitals

- Colonized w/ VRE: 35%
  385 basins/80 hospitals

- MRSA: 3%
  36 basins/28 hospitals

Mechanisms of Contamination

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

Biofilms are ubiquitous
Review

Opportunistic Premise Plumbing Pathogens: Increasingly Important Pathogens in Drinking Water

Joseph O. Falkinham, III 1,*, Amy Pruden 2 and Marc Edwards 2

Clinical Infectious Diseases
INVIITED ARTICLE

HEALTHCARE EPIDEMIOLOGY: Robert A. Weinstein, Section Editor

Healthcare Outbreaks Associated With a Water Reservoir and Infection Prevention Strategies

Hajime Kanamori,1,2 David J. Weber,1,2 and William A. Rutala1,2
1Division of Infectious Diseases, University of North Carolina School of Medicine, and 2Hospital Epidemiology, University of North Carolina Health Care, Chapel Hill

Operating-room machines test positive for Legionella at UW Medicine

Originally published September 19, 2016 at 2:19 pm | Updated September 19, 2016 at 7:31 pm
Understanding Water

• All water with the exception of sterile water and filtered water is contaminated with microbes (eg, potable water, tap water, showers, and ice).

• In healthy persons, contact or ingestion of such water rarely leads to infection.

• However, contact or ingestion of such water may cause infection in immunocompromised persons or when applied to non-intact skin.

• Transmission of these pathogens from a water reservoir may occur by direct and indirect contact, ingestion and aspiration of contaminated water, or inhalation of aerosols.*

 Presented at MSIPC October 6th, 2016, Lansing MI by Dorine Berriel-Cass

A review of prospective studies published between 1998 and 2005 showed that between 9.7% and 68.1% of randomly taken tap water samples on different types of ICUs were positive for *P aeruginosa*, and between 14.2% and 50% of infection/colonization episodes in patients were due to genotypes found in ICU water.
Bathing with CHG Basinless Cloths

- Prospective sequential group single arm clinical trial
- 1787 patients bathed
  - Period 1: soap & water
  - Period 2: CHG basinless cloth bath*
  - Period 3: non-medicated basinless cloth bath

Veron MO et al. Archives Internal Med 2006;166:306-312
26 colonization's with VRE per 1000 patients days vs. 9 colonization's per 1000 patient days with CHG bath

*2% CHG cloth for bathing is consider an off label use of the product.

Veron MO et al. Archives Internal Med 2006;166:306-312
Impact on VRE with 2% CHG Cloth Bathing*

*2% CHG cloth for bathing is consider an off label use of the product.

Veron MO et al. Archives Internal Med 2006;166:306-312
The Efficacy of Daily Bathing with Chlorhexidine for Reducing Healthcare-Associated Bloodstream Infections: A Meta-analysis

John C. O’Horo, MD;¹ Germana L. M. Silva, MD;² L. Silvia Munoz-Price, MD;³ Nasia Safdar, MD, PhD⁴

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental Events</th>
<th>Control Events</th>
<th>Total</th>
<th>Weight</th>
<th>Odds Ratio M–H, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.1 CHG Bathing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borer et al, 2007</td>
<td>2</td>
<td>15</td>
<td>1600</td>
<td>3.3%</td>
<td>0.16 [0.04, 0.70]</td>
</tr>
<tr>
<td>Camus et al, 2005</td>
<td>6</td>
<td>7</td>
<td>1991</td>
<td>5.3%</td>
<td>0.84 [0.28, 2.52]</td>
</tr>
<tr>
<td>Climo et al, 2009</td>
<td>14</td>
<td>41</td>
<td>15472</td>
<td>10.5%</td>
<td>0.34 [0.18, 0.62]</td>
</tr>
<tr>
<td>Gould et al, 2007</td>
<td>171</td>
<td>264</td>
<td>6664</td>
<td>17.1%</td>
<td>0.66 [0.54, 0.80]</td>
</tr>
<tr>
<td>Munoz-Price et al, 2009</td>
<td>29</td>
<td>59</td>
<td>7532</td>
<td>13.1%</td>
<td>0.40 [0.25, 0.62]</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>222</td>
<td>386</td>
<td>33359</td>
<td>49.3%</td>
<td>0.47 [0.31, 0.71]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Odds Ratio M–H, Random, 95% CI</th>
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<tr>
<td>222</td>
</tr>
<tr>
<td>386</td>
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</tbody>
</table>

Heterogeneity: Tau² = 0.12; Chi² = 11.07, df = 4 (P = 0.03); I² = 64%
Test for overall effect: Z = 3.53 (P = 0.0004)

* 1.2.2 CHG Impregnated Cloths

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental Events</th>
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<th>Total</th>
<th>Weight</th>
<th>Odds Ratio M–H, Random, 95% CI</th>
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</thead>
<tbody>
<tr>
<td>Bleasedale et al, 2007</td>
<td>9</td>
<td>22</td>
<td>2210</td>
<td>8.2%</td>
<td>0.39 [0.18, 0.85]</td>
</tr>
<tr>
<td>Dixon and Carver, 2010</td>
<td>8</td>
<td>27</td>
<td>3148</td>
<td>8.0%</td>
<td>0.31 [0.14, 0.69]</td>
</tr>
<tr>
<td>Evans et al, 2010</td>
<td>4</td>
<td>15</td>
<td>1785</td>
<td>5.2%</td>
<td>0.28 [0.09, 0.85]</td>
</tr>
<tr>
<td>Holden and Zellinger, 2009</td>
<td>2</td>
<td>12</td>
<td>2000</td>
<td>3.3%</td>
<td>0.28 [0.06, 1.24]</td>
</tr>
<tr>
<td>Montecalvo et al, 2010</td>
<td>27</td>
<td>57</td>
<td>13864</td>
<td>12.8%</td>
<td>0.43 [0.27, 0.68]</td>
</tr>
<tr>
<td>Popovich et al, 2009</td>
<td>2</td>
<td>19</td>
<td>5610</td>
<td>3.4%</td>
<td>0.13 [0.03, 0.54]</td>
</tr>
<tr>
<td>Popovich et al, 2010</td>
<td>17</td>
<td>19</td>
<td>5799</td>
<td>9.8%</td>
<td>1.14 [0.59, 2.19]</td>
</tr>
<tr>
<td>Subtotal (95% CI)</td>
<td>34116</td>
<td>67399</td>
<td>50.7%</td>
<td></td>
<td>0.41 [0.25, 0.65]</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Odds Ratio M–H, Random, 95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Total events</th>
</tr>
</thead>
<tbody>
<tr>
<td>69</td>
</tr>
<tr>
<td>171</td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.19; Chi² = 12.80, df = 6 (P = 0.05); I² = 53%
Test for overall effect: Z = 3.78 (P = 0.0002)

<table>
<thead>
<tr>
<th>Total (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>67775</td>
</tr>
<tr>
<td>69617</td>
</tr>
<tr>
<td>100.0%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Odds Ratio M–H, Random, 95% CI</th>
</tr>
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<tbody>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Total events</th>
</tr>
</thead>
<tbody>
<tr>
<td>201</td>
</tr>
<tr>
<td>557</td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.13; Chi² = 26.12, df = 11 (P = 0.006); I² = 58%
Test for overall effect: Z = 5.39 (P < 0.000001)
Test for subgroup differences: Chi² = 0.19, df = 1 (P = 0.66), I² = 0%

*2% CHG cloth for bathing is consider an off label use of the product.
The Evidence: Impact of 2% CHG Cloth Baths*

Evaluate effect of daily bathing with CHG on acquisition of 9ICU’s & Bone Marrow Transplant unit
Randomly assigned 7727 patient:
  a. No-rinse, 2% CHG impregnated washcloths*
  b. Non-antimicrobial, no-rinse bath cloths

Impact of 2% CHG Cloth Baths*
Study to determine the best method for reducing spread of MRSA

3 protocols tested:
a) Swab for MRSA on admission to ICU
   – Isolate if positive
b) Swab for MRSA on admission to ICU
   – Isolate if positive
   – Nasal mucopiricin x 5 days
   – 2% CHG cloth* bathing for entire ICU stay
c) No swab
   – Nasal mucopiricin x 5 days
   – 2% CHG bath* for entire ICU stay

CHG Bathing: Meta-Analysis

- Meta-analysis performed using Cochrane Collaboration methodology
- 18 studies included
- Examine risk of acquiring HAI: CLA-BSI, MRSA, VRE
- Longer duration & nasal antibiotic showed even lower risk MRSA

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Impact of 2% CHG Cloth Bath*: Follow Up Analysis On Universal Decolonization on Bacteriuria & Candiduria

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c) No swab
   – Nasal mucopiricin x 5 days
   – 2% CHG cloth bath* for entire ICU stay

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CHG Bathing Process

Monitor for compliance by assessing amount of CHG on the skin (Assay). Prevent sub-optimal concentrations


*2% CHG cloth for bathing is consider an off label use of the product.

Cleansing of Patients with Indwelling Catheter

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

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>
</tbody>
</table>
| Storage of patient items        | Clear plastic “baggies”  
Trial of “Concierge List” to decrease waste of unused/unneeded products |
| Shampoo patient’s hair          | Shampoo caps par’d on all units                                     |
| 24 hour urine, ice              | Store some basins in lab to be dispensed with each 24 hour jug.      |
| Bath cloths with no insulation, cold halfway through bath. | Bath cloths with insulation to stay warm longer |
Even if you are on the right track, you will get run over if you just sit there.

Will Rogers
Driving Change

- Gap analysis
- Build the Will
- Protocol Development

Structure

- Protocol Development
- Make it Prescriptive
- Overcoming barriers
- Daily Integration

Process

Outcomes

• Gap analysis
• Build the Will
• Protocol Development
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.