Evidence vs. Tradition: Examining the science on bathing critically ill patients

Kathleen M. Vollman, Advancing Nursing

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

- Create the link of patient advocacy to the basic nursing care
- Define key fundamental evidence based nursing care practice of bathing to reduce harm/infection
- 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
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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

Comprehensive Oral Care Plan

Incontinence Associated Dermatitis Prevention Program

Bathing & Assessment

Pressure Ulcer Prevention

Catheter Care

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INTERVENTIONAL PATIENT HYGIENE (IPH)

HAND

Patient

HYGIENE

VAP/HAP

Oral Care/ Mobility

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

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rank order of error reduction strategies

- forcing functions and constraints
- automation and computerization
- standardization and protocols
- checklists and double check systems
- rules and policies
- education / information
- be more careful, be vigilant

why hai's?
protecting patients from harm

estimates: 183 hospitals in 10 states

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</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 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>27 days vs. 59 days</td>
</tr>
</tbody>
</table>

magill ss, et al. new england journal of med, 2014;370:1198-208

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Common Routes of Transmission

Reducing MDRO’s

- Hand hygiene (Electronic versus direct observation more accurate in measuring compliance)
- Decontamination of environment and equipment
- Ultraviolet–C to kill pathogens.¹,²
  - After 45 minutes of use, C. difficile spores were reduced by up to 99 percent.
  - 15 minutes for non-spore forming bacteria
- Decontamination of the patient
- Practice the device bundles (VAP, BSI, UTI)

¹Morgan DJ, et al. AJIC, 2012;40:955-959
²Nerandzic MM, et al. BMC Infect Dis 2010 Jul 8;10:197
³Havill NL et al. Infect Control Hosp Epidemiol, 2012;33:507-512
⁵www.ihi.org

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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

The Bath: The First Line Of Defense

Early Detection of Skin Injury

Nurse!!!

Reducing Microorganism spread

Efficiency & Effectiveness

Health/Social Well Being

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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
  - Skin pH requires 45 minutes to return to normal following a
    ordinary washing

- 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

Veegal D. J WOCN, 2008;35(1):84-90

The Evidence: Reasons for Bathing

37% Clinical Indications
22% Incontinence
14% Freshen Up
7% Diaphoresis


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Timing of Bath

40% baths occur 2400 – 0600
- Timing for bathing varies globally
- Consider patient need for sleep and energy reserves.

Avoid:
- Nurse preference
- Organizational factors
- Unit norms


Traditional Bathing

Soap and water basin bath was an independent predictor for the development of a CLABSI

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Environmental Contamination as a Source of Health Care Acquired Pathogens

<table>
<thead>
<tr>
<th>Pathogen</th>
<th>Survival</th>
<th>Data</th>
<th>Transmission Settings</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. difficile</td>
<td>Months</td>
<td>3+</td>
<td>Healthcare facilities</td>
</tr>
<tr>
<td>MRSA</td>
<td>d-weeks</td>
<td>3+</td>
<td>Burn units</td>
</tr>
<tr>
<td>VRE</td>
<td>d-weeks</td>
<td>3+</td>
<td>Healthcare facilities</td>
</tr>
<tr>
<td>Acinetobacter</td>
<td>33 d</td>
<td>2/3+</td>
<td>ICUs</td>
</tr>
<tr>
<td>P. aeruginosa</td>
<td>7 h</td>
<td>1+</td>
<td>Wet environments</td>
</tr>
</tbody>
</table>

Hands equally become contaminated from commonly examined skin sites & environmental surfaces


The Evidence: Bath Basins
Potential Source of Infection

Multicenter Sample Study to Identify and Quantify Bacteria in Basins

- Enterococci  54%
- Gram negative 32%
- S. aureus  23%
- VRE  13%
- Less than 10% growth rates
  - MRSA  8%
  - P. aeruginosa  5%
  - Candida albicans  3%
  - E. coli  2%


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Bath Basins
Potential Source of Infection

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

- Contaminated: 686 basins/88 hospitals (62%)
- Gram negative bacilli: 495 basins/86 hospitals (45%)
- Colonized w/ VRE: 385 basins/80 hospitals (35%)
- MRSA: 36 basins/28 hospitals (3%)


Mechanisms of Contamination

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

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Waterborne Infection

Hospital Tap Water
- Most overlooked source for pathogens
- 29 studies demonstrate an association with HAIs and outbreaks
- Transmission:
  - Drinking
  - Bathing
  - Rinsing items
  - Contaminated environmental surfaces
- Immunocompromised patients at greatest risk


Prepackaged Disposable Bathing

Studies show

Prepackaged disposable bathing cloths result in...

- Nurse satisfaction
- Improved skin condition
- 78% fewer UTIs
- Amount of product used
- Time spent
- Cost
- Variation in bathing process

Larson E. et al. AJIC. 2004; 13(1):235-41

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Antisepsis Bathing

- 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
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Table 3. Percentage of Environmental Surface Culture Specimens That Were Positive for Vancomycin-Resistant Enterococci During the 3 Study Periods*

<table>
<thead>
<tr>
<th>Site Where Culture Specimen Was Obtained</th>
<th>Soap and Water (n = 311)</th>
<th>Chlorhexidine (n = 307)†</th>
<th>Nonmedicated Cloth (n = 140)‡</th>
</tr>
</thead>
<tbody>
<tr>
<td>Table</td>
<td>10 (3)</td>
<td>4 (1)</td>
<td>13 (9)</td>
</tr>
<tr>
<td>Bed rail</td>
<td>33 (11)</td>
<td>13 (4)</td>
<td>23 (16)</td>
</tr>
<tr>
<td>Pull sheet</td>
<td>63 (20)</td>
<td>17 (6)</td>
<td>43 (31)</td>
</tr>
</tbody>
</table>

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; Germana L. M. Silva, MD; L. Silvia Munoz-Price, MD; Nasia Safdar, MD, PhD

<table>
<thead>
<tr>
<th>Study or Subgroup</th>
<th>Experimental Events</th>
<th>Control Events</th>
<th>Odds Ratio</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.2.1. CHG Baths</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Borel et al., 2007</td>
<td>2300</td>
<td>35 1523</td>
<td>0.16 (0.04, 0.70)</td>
<td></td>
</tr>
<tr>
<td>Cremers et al., 2009</td>
<td>1991</td>
<td>7 1903</td>
<td>0.84 (0.37, 1.92)</td>
<td></td>
</tr>
<tr>
<td>Cremers et al., 2009</td>
<td>11572</td>
<td>63 15255</td>
<td>0.34 (0.18, 0.62)</td>
<td></td>
</tr>
<tr>
<td>Goulet et al., 2007</td>
<td>171 6664</td>
<td>264 6909</td>
<td>0.50 (0.25, 0.93)</td>
<td></td>
</tr>
<tr>
<td>民用 et al., 2009</td>
<td>79 7632</td>
<td>59 8230</td>
<td>0.60 (0.25, 1.47)</td>
<td></td>
</tr>
<tr>
<td>Total events</td>
<td>212</td>
<td>386</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Heterogeneity: Tau² = 0.61; CH² = 11.07, df = 6 (P = 0.03); I² = 64%
Test for overall effect: Z = 3.13 (P = 0.0014)

1.2.2. CHG Impregnated Cloths

Biswas et al., 2007 | 9 2210 | 22 2199 | 0.19 (0.08, 0.46) |          |
| Oxford and Connaught, 2010 | 8 3148 | 27 3346 | 0.53 (0.34, 0.85) |          |
| Evans et al., 2009 | 4 1795 | 15 1804 | 0.29 (0.09, 0.91) |          |
| Becker and Delinger, 2009 | 2 2006 | 12 3333 | 0.26 (0.06, 1.24) |          |
| Montecalvo et al., 2010 | 7 13864 | 57 13903 | 0.43 (0.27, 0.68) |          |
| Appelshaus et al., 2009 | 2 5610 | 86 6798 | 0.31 (0.10, 0.94) |          |
| Papadakis et al., 2008 | 17 1796 | 13 1716 | 0.14 (0.03, 0.53) |          |
| Subtotal (95% CI) | 34516 | 37999 | 93% | 0.41 (0.24, 0.68) |          |

Heterogeneity: Tau² = 0.33; CH² = 12.03, df = 6 (P = 0.03); I² = 53%
Test for overall effect: Z = 3.19 (P = 0.0012)

Total (95% CI) | 67775 | 69637 | 100% | 0.44 (0.33, 0.55) |          |

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Antisepsis Bathing: SCRUB Trial
Critically Ill Children
- Cluster-randomized 2-period cross over trial
- >2 months of age
- 6 months
- 4947 admissions
  - SOC: basin less bathing or soap & H₂O
  - CHG: 2% CHG cloth
- Demographics similar
- Outcomes:
  - Primary bacteremia-36% reduction
  - 12 pts withdrew because of skin irritations (1%)
  - CHG-associated skin reactions 1-2 per 1000 pt days

Daily Bathing
- 36% Reduction


The Evidence: Impact of Antisepsis Bathing
Evaluate effect of daily bathing with CHG on acquisition of MDRO’s and incidence of CLABSI

9ICU’s & Bone Marrow Transplant unit
Randomly assigned 7727 patient:
- a. No-rinse, 2% CHG impregnated washcloths
- b. Non-antimicrobial, no-rinse bath cloths

Results of 2% CHG bathing


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Impact of Antisepsis Bathing
Study to determine the best method for reducing spread of MRSA & MDROs

3 protocols tested:

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


Results:
- No Swab Group
  - Universal Decolonization Demonstrated
  - 37% reduction
  - 44% reduction

Single Center CHG Bathing Study

- A pragmatic cluster randomized, crossover study of 9340 patients admitted to 5 adult intensive care units of a tertiary medical center in Nashville, Tennessee, from July 2012 through July 2013.
- Units performed once-daily bathing of all patients with disposable cloths impregnated with 2% chlorhexidine or non-antimicrobial cloths as a control
- Bathing treatments were performed for a 10-week period followed by a 2-week washout period during which patients were bathed with non-antimicrobial disposable cloths, before crossover to the alternate bathing treatment for 10 weeks…3x
- Results
  - No difference in CLABSI’s, CAUTI’s, VAP & c-diff infections were seen

Noto MJ, et al. JAMA, published online 01/20/2015
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Limitations:
• Adherence to care practice was not monitored
• Intracluster correlation nor sequence of randomization was consider in the analysis
• Used outcomes measures beyond previous studies
• Active surveillance was not perform to detect cross over transmission of MDRO’s
• Wasn’t registered on the clinical trials site

Pittet D, et al. JAMA, published online 01/20/2015

Recommendations and Implementation Strategies

1. Bath patients daily in ICU with CHG (determine if exclusion criteria)

2. Patient-centered bath times
   ▪ Evaluate clinical stability and patient preference.
   ▪ Avoid bathing between 2400 - 0600.
   ▪ Evaluate workloads on all shifts.
   ▪ Adjust distribution of care practices.

3. Avoid reusable bath basins and use of washcloths
   - Remove soaps and creams from the unit stock.
   - Replace basin with better strategies for containing emesis and keeping supplies.
   - Reduce par levels of washcloths.

4. Avoid tap water for any component of bathing ICU patients

5. Use a no-rinse pH-balanced cleanser for facial cleansing

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Recommendations and Implementation Strategies

6. Procedure:
- After routine washing of face and hair, remove one batch of CHG cloths (three bundled packages of two cloths each = six cloths).
- Warming is for patient comfort, it is not required.
- Cloths should be used to bathe the skin with firm massage.
- Do not use CHG above the jawline
- CHG should be used for incontinence care, or for any other reasons for additional cleaning
  - If incontinence occurs, rinse the affected area with water and clean with chux. Then clean skin with CHG cloths.
- Use CHG-compatible barrier products if needed
- Do not rinse with water or wipe off


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>
<tr>
<td>Storage of patient items</td>
<td>Clear plastic “baggies” Trial of “Concierge List” to decrease waste of unused/unneeded products</td>
</tr>
<tr>
<td>Foot soaks</td>
<td>Shampoo caps, prepackaged</td>
</tr>
<tr>
<td>Shampoo patient’s hair</td>
<td>Shampoo caps par’d on all units</td>
</tr>
<tr>
<td>24 hour urine, ice</td>
<td>Store some basins in lab to be dispensed with each 24 hour jug.</td>
</tr>
<tr>
<td>Bath cloths with no insulation, cold halfway through bath.</td>
<td>Bath cloths with insulation to stay warm longer</td>
</tr>
</tbody>
</table>

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General Implementation Strategies

Educate patients and families about new bathing technologies
- Improves condition of the skin
- Reduces the spread of microorganisms
- Should not be rinsed off

Monitor compliance
- Assess estimated number of baths given
- Compare to use of bathing products used.

Strategies for Successful Implementation

• Baseline measurement of HAI’s
• Build the Will
• Reduce process variation
• Cost-benefit analysis
• Place resources at point of care
• Monitor compliance
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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

Coming Soon

September 28  (Free British Teleclass ... Broadcast live from the 2015 IPS conference)
WHAT DID THE ROMANS EVER DO FOR US?
Carole Fry, Healthcare Infection Society

September 29  (Free British Teleclass ... Broadcast live from the 2015 IPS conference)
FAECAL TRANSPLANT TO TREAT CLOSTRIDIUM DIFFICILE DISEASE
Dr. Jonathan Sutton, Betsi Cadwaladr University Health Board, Wales

September 29  (Free British Teleclass ... Broadcast live from the 2015 IPS conference)
DEBATE – SELECTIVE DECONTAMINATION OF THE GUT
Dr. Cliff McDonald, Division of Healthcare Quality Promotion, USA, and Professor Jan Kluymans, St Elisabeth Hospital, The Netherlands

September 30  (Free British Teleclass ... Broadcast live from the 2015 IPS conference)
THE EMERGENCE OF MERS: FROM ANIMAL TO HUMAN TO HUMAN
Professor Ziad Memish, Prince Mohammed Bin Abdulaziz Hospital, Saudi Arabia

October 14  (FREE WHO Teleclass - Europe)
THE USE OF SOCIAL MEDIA IN SUPPORT OF GLOBAL INFECTION PREVENTION AND CONTROL

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