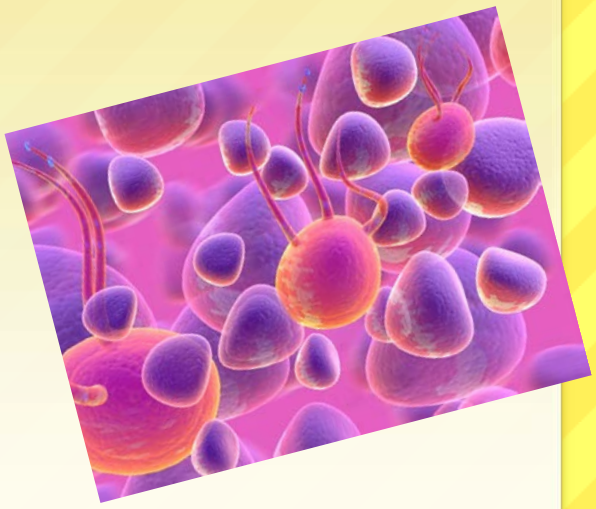
The Science of Bathing & Skin Protection: Examining the Evidence



Kathleen M. Vollman MSN, RN, CCNS, FCCM, FAAN
Clinical Nurse Specialist / Educator / Consultant
ADVANCING NURSING
kvollman@comcast.net
Northville Michigan
www.vollman.com

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

Protecting From Harm

- 1.7 million estimated HAI annually
- 100,000 deaths
- 1 out of 17 hospitalized patients will develop an infection
- Pressure ulcers, 4th leading preventable medical error
- 3 million patients are treated annually
- 60,000 deaths
- Estimated 45 billion spent HAI preventable injury
- 10-15 billion spent skin preventtable injury

Milstone Am, et al. Clin Infect Dis. 2008;46(2):274-281
Klevens RM, et al. Public Health Rep. 2007;122:160-166
Burke JP, et al. N Engl J Med. 2003;348:651-656
Dorner, B., Posthauer, M.E., Thomas, D. (2009), www.npuap.org/newroom.htm

Patients Are at Risk

- **Exposure to MDRO's:**
  - Immunodeficiency's
  - Breaks in skin integrity r/t 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
Popovich KJ, et al. Infect control and Hosp Epidemiol, 2012;33:889-896
Weber DS, et al. Am J Of Infect control, 2010;38:S25-33.

The Bath: The First Line Of Defense

Early Detection of Skin Injury

Nurse!!!

Reducing Microorganism spread

Efficiency & Effectiveness

Optimal Bathing Hygiene

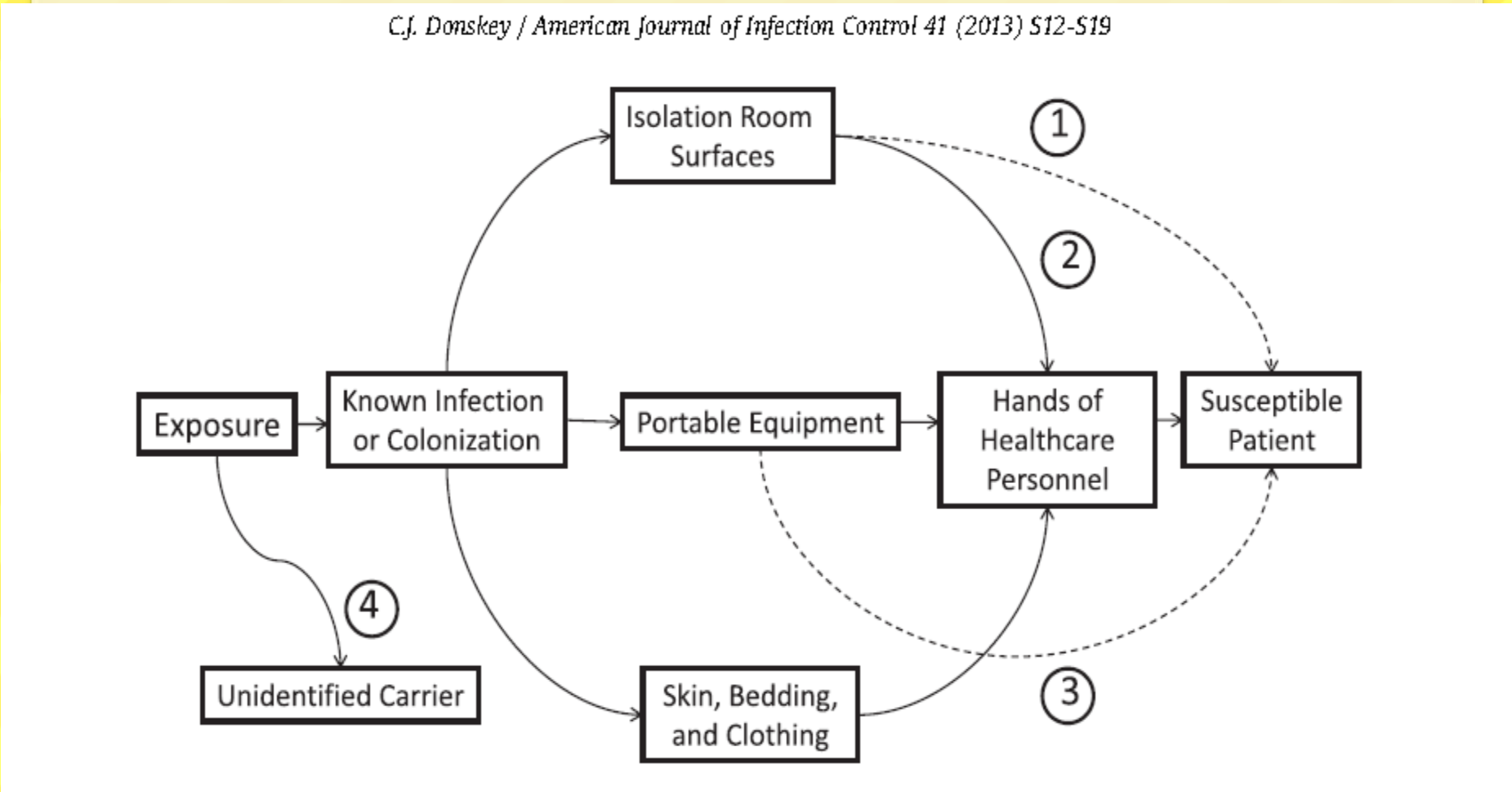
- No-Rinse pH balanced (4-6.8)
  - Stable pH discourages colonization
  - Protects the barrier function of the skin
- Multiple steps can lead to significant process variation
  - 64% of patients did not receive emollients after a basin bath
  - Pre-packaged bathing reduces the risk of drying, breaks in integrity & process variation
- Excessive washing/use of soap compromises the water holding capacity of the skin

Voegel D. J WOCN, 2008;35(1):84-90
Hodgskin B, et al. J of clinical Nurs, 2007;16:129-136
Bryant RA, et al. Ostomy Wound Mange. 2001,46(6):18-27
Coyer FM, et al. Aust Crit Care. 2001;24:198-209

Traditional Bathing

Spreading Microorganism

Common Routes of Transmission



Environmental Contamination as a Source of Health Care Acquired Pathogens

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

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

Hota B, *Clin Inf Dis* 2004; 39(8):1182-9
Stiefel U et al. Infect control & Hosp Epidemiol 2011;32:185-187.

Bath Basins: Potential Source of Infection

- Multicenter sampling study (3 ICU's) of 92 bath basins
- Identify & quantify bacteria in patients basins
- > 2x in patients hospitalized > 48 hours
- Testing done 2 hrs post bath
- Cultures sent to outside laboratory
- Bathing practices not controlled & no antiseptic soaps used to bathe

Johnson D, et al. Am J of Crit Care, 2009;18:31-40

Bath Basins: Potential Source of Infection

Results

- 98% of all cultures grew bugs
- Enrichment Results
  - 54% enterococci. 32% for gram -, 23% for *S aureus* and 13% VRE (statistically significant)
  - <10% growth rates for: MRSA 8%, *P aeruginosa* 5%, *C albicans* 3% & *E coli* 2%

Johnson D, et al. Am J of Crit Care, 2009;18:31-40

Large Multi-Center Basin Evaluation For Presence of MDRO's

Methodology

- 88 hospitals from US & Canada
- Randomly selected basins for damp swab culture
- External lab tested for MRSA & VRE & gram – bacilli
- All basins were clean & were not visibly soiled

Results:

- 1103 basins: 62.2% contaminated
- 385 basins (34.9%) from 80 hospitals were colonized with VRE
- 495 basins (44.9%) from 86 hospitals had gram-negative bacilli
- 36 basins (3.3%) from 28 hospitals had MRSA

Marchaim D, et al. Am J of Infect Control. 2012;40(6):562-564

How Does Contamination Potentially Happen?

- Patient skin flora
- Basins used for incontinence cleansing
- Used for emesis
- Storage of hygiene products
- Bacterial biofilm from the tap water
- Tap water through shower heads

Shannon R, et al. J of HC Safety, Compl & IC, 1999;3:180-184
Larson EL, et al. J Clin Microbiol. 1986;23(3):604-608
Johnson D, et al. Am J of Crit Care, 2009;18:31-40
Marchaim D, et al. Am J of Infect Control. 2012;40(6):562-564
Burgel L, et al. Infect Control Hosp Epidemiol,ed 2013:34:

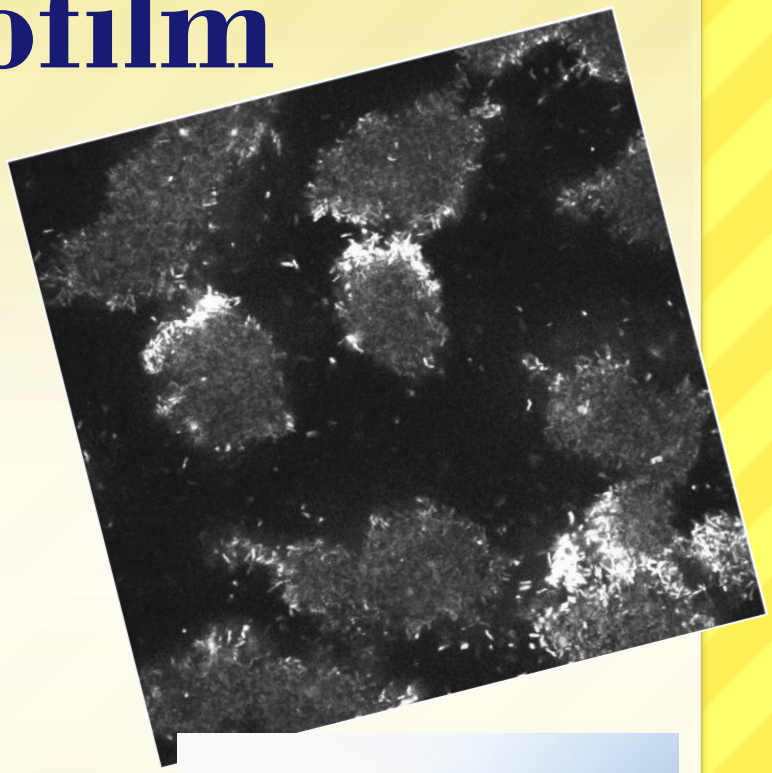
Waterborne Infections Study

- Hospital tap water most overlooked source for Health-care associated pathogens
- 29 evidenced-based studies show waterborne Health-care associated infections
- Transmission occurs; drinking, bathing, items rinsed with tap water and contaminated environmental surfaces
- Immunocompromised patients most at risk
- Recommendation I: Minimize patient exposure to hospital tap water via bottled water and pre-packaged, disposable bathing sponges

Anaissie E. et. al. Arch Int Med. 2002; 162:1483-92

Bacteria Biofilm

- Organized communities of viable & non-viable microorganisms
- Adhere to inert material (plumbing)
- Bacteria contain within Biofilm may be transmitted to at risk patients by direct contact with water used for ingestion, ice cleaning of equipment and bathing



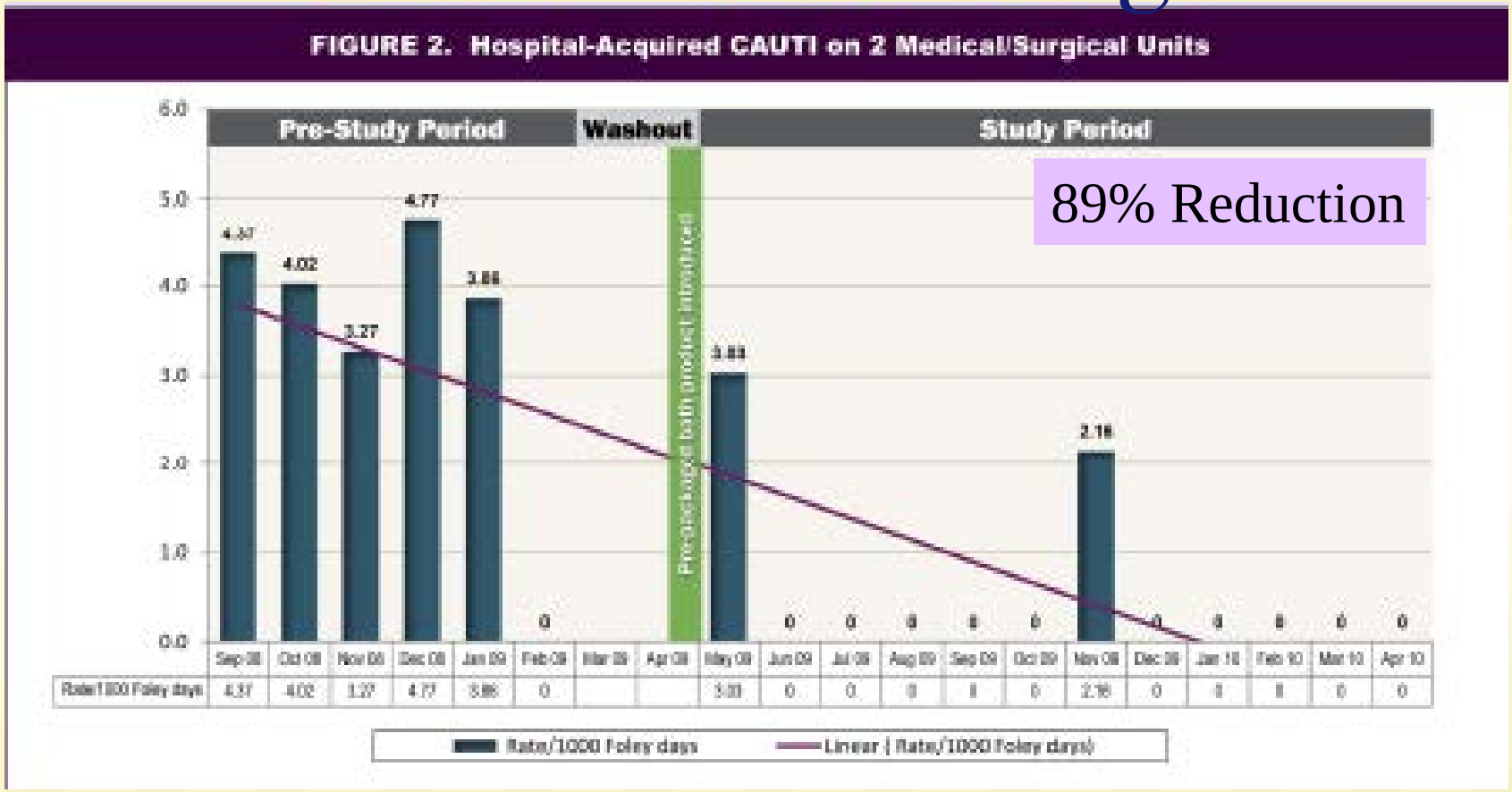
Cervia JS, et al. Arch Intern Med, 2007;167:92-93
Trautmann M, et al. Am J Infect Control. 2005;33:S41-49
Exner M, et al Am J of Infect Control, 2005;33:S26-40
Wolcott RD, et al. JAMA. 2008;299:2682-2684

ICU & Hospital Water Samples

- Systematic review published studies 1998-2005 (29 studies)
  - 9.7%-68.1% of random ICU water samples + for Pseudomonas aeruginosa
  - 14.2%-50% of patient infections were due to genotypes found in ICU water
- 9 hospital in New York city
  - Bacteria recovered in every hospital
  - 4-14 species identified
  - 1/3 organism known to be responsible for HAI's

Trautmann M, et al. Am J of Infect Control, 2005;33(5):S41-S49,
Cervia JS, et al. Arch Intern Med, 2007;167:92-93

Reducing UTIs Through Basinless Bathing

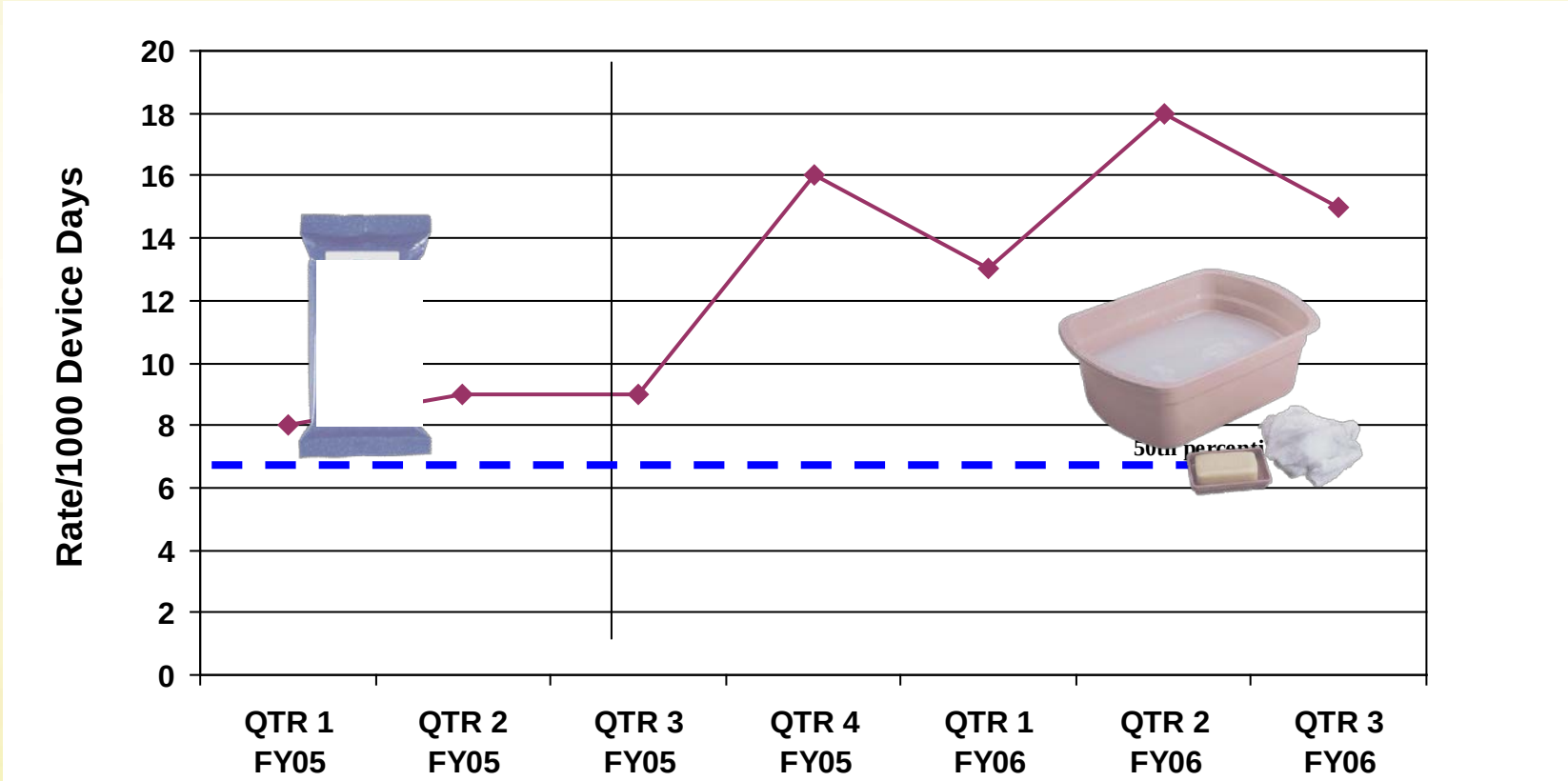


CA-UTI 7.5 per 1000 catheter days to 4.42 per 1000 catheter days, then to .46 per 1000 catheter days

Stone S, et al. 37th Annual APIC Educational Conference July 11-15, 2010

Impact on UTI with Basin Bathing

UTI Rate- Removal of Prepackaged Bath Product QTR 3 FY05



McGuckin M, Torress-Cook A, et al APWCA Annual Meeting, Philadelphia, April 2007

The Effect of Bathing with Basin and Water and UTI Rate, LOS and Costs

Unit Census: 14				
Phases	**Product Cost/**	**No. of UTI**	**Median[4] LOS 17 Days**	**Median[4] Cost (4857.00)**
I- Pre-Packaged Bathing Washcloths (9 months)	$10,530[1] ($3.00)	25	175	$117,175
II- Basin/Water (9 months)	$3,510[2] ($1.00)	48	336	$224,916
III- Additional Product Cost, UTI, LOS, COSTS	$7,020	23[3]	151	$107,741

[1]Based on 3 packages of 8 towels each [2]Based on product cost of towels, soap, and basin[3] Difference between phase I pre-package/phase II basin water[4]

Chen Yin-Yin, et al. Infect Control Hosp Epidemiol 2005;26:281-287

Pre-Packaged Disposable Bathing vs. Basin Bathing

- Basin bathing ↑ steps
- Pre-package bathing used significantly less products, less time, lower cost and higher nurse satisfaction
- Reduction in UTI's by 78%
- Skin condition significantly improved, less dryness and skin tears

Larson E. et al. AJCC. 2004; 13(3):235-41
McGuckin M, et al Am J Infect Control. 2008 Feb;36(1):59-62
Shepard CM, et al. J of Gerontol Nurs. 2003;49:36-45
Birch S, et al. Ostomy Wound Manage. 2003;49:64-67
Winslow EH, et al. Nurs Res. 1985;34:164-169

Suggestions

- Use a no-rinse pH balance soap and apply an emollient after each bath (unless using pre-packaged)
- Eliminate the use of tap water for bathing
- Avoid reusable basins
- Use prepackaged bathing products
- Eliminate baths being performed between 2400 and 0600
- Educate patients and family that bathing technology has changed to improve condition of the skin and reduce the spread of bugs.

How to Change Bathing Practices In Your ICU

- Remove the basin completely from the environment
  - Keep a par level in central supplies
  - Remove soaps and creams from unit stock
  - Equipment to manage emesis and holding supplies
- ↓ par levels of washcloths
- Monitor compliance by assessing estimated baths vs. product used

Protecting From Harm: Skin Injuries Related to Moisture

- 1/3 hospitalized patient experience urinary and fecal incontinence
- Strain at which the skin breaks is 4x greater with excess moisture than dry skin

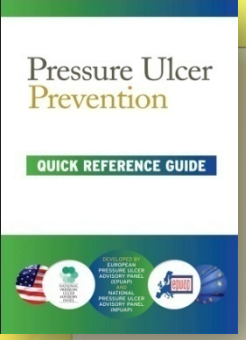
Moisture increases the risk of shear & friction damage

Nicolopoulos CS, et al. Arch Dermatol Res. 1998;290:638-640
Bliss DZ, et al. Nurs Res.2000;49:101-108.
Gray M, et al. Adv Skin Wound Care. 2002;15(4):170-175.

Moisture Injury: Incontinence Associated Dermatitis

- Inflammatory response to the injury of the water-protein-lipid matrix of the skin
- Top-down injury
- Physical signs on the perineum & buttocks

Brown DS & Sears M, OWM 1993;39:2-26
Gray M et al OWN 2007;34(1):45-53.
Doughty D, et al. JWOCN. 2012;39(3):303-315



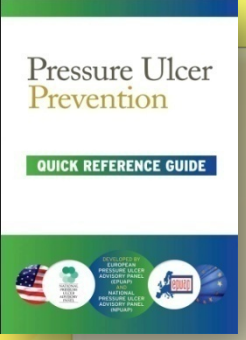
EBP Recommendations to Reduce Injury From Incontinence & Other Forms of Moisture

- Clean the skin as soon as it becomes soiled.
- Use an incontinence pad to absorb/wick away
- Use a protective cream or ointment
  - Disposable barrier cloth recommended by IHI & IAD consensus panel
- Pouching device or a bowel management system
- Microclimate & breathability

National Pressure Ulcer Advisory Panel and European Pressure Ulcer Advisory Panel. Pressure ulcer prevention & treatment :clinical practice guideline. Washington, DC: National Pressure Ulcer Advisory Panel; 2009.
Williamson, R, et al (2008) Linen Usage Impact on Pressure and Microclimate Management. Hill-Rom
www.ihi.org

Challenges of Incontinence Care

- Individually packaged products are not always within reach
- Risk of unprotected skin is high
- Cleaning and protection done separately
- Washcloths disposable when soiled
- Increased risk for contamination
- Not all products have a chemical barrier



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