


Hot Off the Press - A Review of the Evidence


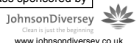
Dr. William Jarvis, Jason and Jarvis

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**Hot Off the Press -
A Review of the Evidence**

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Disclosure

Consultant to:
3M, Bard, BD, J&J, and Kimberly Clark

Purpose

- Provide an overview of the major evidence-based methods to prevent healthcare-associated infections (HAIs).
- Illustrate how applying current infection prevention and control measures can markedly reduce these HAIs—maybe even to ZERO.

Hand Hygiene



Antiseptic Hand Rinses

- 60-70% alcohol solutions
- Effective against most bacteria, viruses, fungi
- Protective against hand drying
- Faster, increased compliance



Hand Hygiene-Let's Be Realistic

- Good luck getting to (and sustaining) 100% compliance.
- Clinician accountability, driven by administrators, is essential. Infection control is everyone's responsibility, not just infection control's!
- Observations of hand hygiene compliance are tedious, personnel resource intensive, and subject to enormous inter-rater variability.
- Electronic monitoring is coming and may provide better coverage and better data!

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Urinary Tract Infections (UTIs)

Background

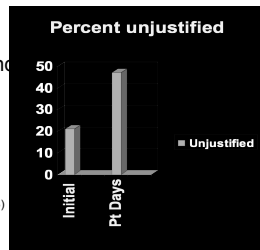
- Urinary tract infections (UTIs) often are the most common site of HAI.
- Most UTIs (80%) are associated with urinary catheterization.
- Approximately 25% of inpatients are catheterized.
- Attack rate: 2.0-3.1 UTIs per 100 admissions.

UTI Prevention Rule: Make Sure the Patient Really Needs the Catheter

Appropriate indications

- Bladder outlet obstruction
- Incontinence and sacral wound
- Urine output monitored
- Patient's request (end-of-life)
- During or just after surgery

(Wong and Hooton - CDC 1983)



1995;155:1425-9.

Why are Catheters Used Inappropriately?

- Perhaps physicians "forget" that their patient has a urinary catheter.
- Study to determine the extent to which physicians are aware which of their inpatients have urinary catheters.
- Surveyed 56 medical teams at 4 sites; 256 providers completed the survey (response rate = 89%)

Saint S et al. Am J Med 2000;109:476-80.

Urethral Catheters: Lost in Place?

Training Level	Proportion Unaware	95% CI
Medical Student	18%	8-32%
Intern	22%	13-34%
Resident	28%	20-38%
Attending	38%	26-45%

** URINARY CATHETER REMINDER **

Date: ___/___/___

This patient has had an indwelling urethral catheter since ___/___/___.

Please indicate below **EITHER** (1) that the catheter should be removed **OR** (2) that the catheter should be retained. If the catheter should be retained, please state **ALL** of the reasons that apply.

- Please **discontinue** indwelling urethral catheter; **OR**
- Please **continue** indwelling urethral catheter because patient requires indwelling catheterization for the following reasons (please check **all** that apply):
- Urinary retention
 - Very close monitoring of urine output and patient unable to use urinal or bedpan
 - Open wound in sacral or perineal area and patient has urinary incontinence
 - Patient too ill or fatigued to use any other type of urinary collection strategy
 - Patient had recent surgery
 - Management of urinary incontinence on patient's request
 - Other - please specify: _____

Physician's Signature _____

Doctor Number _____

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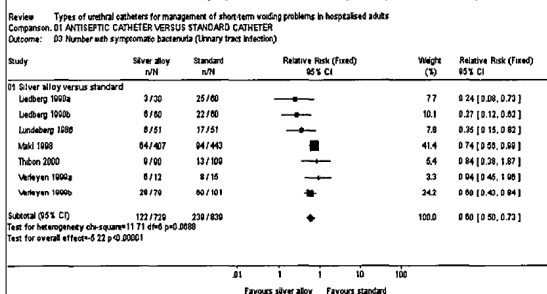
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Prevention of Catheter-related UTI using Silver Catheters: The Silver Bullet?

- Silver has *in vitro* antibacterial activity.
- Efficacy of silver catheters shown in meta-analysis of randomized trials (Saint S et al. Am J Med, 1998).
- Additional cost of \$5.30 per silver catheter tray.
- Is the reduction in catheter-associated UTIs worth the extra cost?

Meta-Analysis of CA-UTI Prevention-Silver Alloy Catheters

01.03 Number with symptomatic bacteriuria (Urinary tract infection)



Brosnahan J. et al. Cochrane Database Systematic Review 2004;(1):CD004013

Silver Catheters: What Is The Evidence Base?

- To date, 11 comparative studies and two meta-analyses of silver (the majority being the silver alloy urinary catheter) vs. non-coated Foley catheters have been conducted.
- In every comparative trial, the number of CA-UTIs has been decreased in the impregnated silver-coated catheter group compared to the non-coated catheter group.
- In some of these studies, the number of patients included has been small and thus a statistically significant decrease in CA-UTIs has not been documented (insufficient power). Nevertheless, in every study, a decrease in the rate of CA-UTI or CA-bacteriuria has been documented.

Silver Catheters: What Is The Evidence Base?

- In both meta-analyses, combining a variety of studies to increase the power to detect a difference in efficacy of silver-coated catheters, the authors have concluded that the silver-alloy coated catheter is associated with a significant reduction in CA-UTI and CA-bacteriuria.
- These data strongly support that silver alloy hydrogel impregnated urinary catheters can decrease the risk of CA-UTI or CA-bacteriuria compared to non-coated catheters in patients who are to be catheterized for 3-7 days.

CA-UTI Prevention: Summary Recommendations

- Use urethral catheters only when necessary.
- Use aseptic technique for catheter insertion and manipulation.
- Maintain a closed urinary drainage system.
- Require a urinary catheter insertion indication/order and consider using an administrative urinary catheter "stop order" to limit inappropriate catheterization.
- Consider silver catheters in high-risk patients who require catheterization for 3-7 days.

Preventing Central Venous Catheter-Associated Bloodstream Infections (CVC-BSIs)

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Impact of primary BSI

Crude mortality
10% to 40%

Attributable mortality
2% to 15%

Prolongation of hospitalization
5 to 20 days

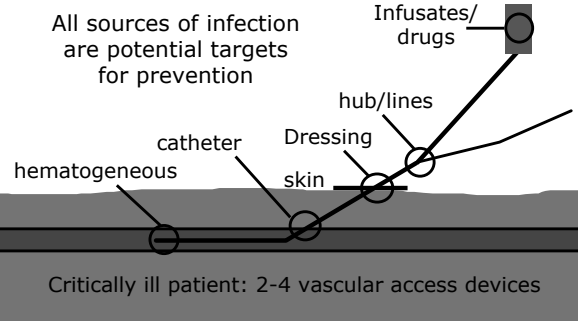
Attributable cost
\$34,000 to \$56,000



Wey et al. Arch Intern Med 1988; Voss et al. Infection 1997
 Pelz et al. J Int Care Med 2000; Blot et al. Am J Med 2002

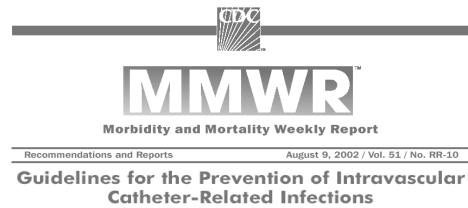
Pathophysiology of Catheter-Related Infection

All sources of infection
are potential targets
for prevention



Preventing CVC-Related BSIs — First, Think About the Need.

- Use intravascular catheters only when necessary
- Choose the lowest risk catheter appropriate for the patient's needs
 - Peripheral IV instead of CVC for short-term access in a patient who is not seriously ill
 - Peripherally inserted central catheter (PICC) or tunneled, cuffed CVC instead of percutaneous CVC for long-term access
- Minimize the duration of catheterization



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Strategies to Prevent Central Line-Associated Bloodstream Infections (CLA-BSIs) in Acute Care Hospitals.



Marschall J, et al
 ICHE 2008;29:S22-30

Basic Approaches for the Prevention of CLA-BSIs

Basic Practices

Catheter Checklist	B- II
Hand Hygiene	B- II
Insertion site-Femoral	A- I
Cart Kit	B- II
Maximal Barrier Precautions	A- I
Chlorhexidine (CHG) Skin Prep	A-1

Marschall J, Mermel LA, Cosimi D, Aronoff PE, Palopony K, Anderson DJ, et al.
 Infect Control Hosp Epidemiology 2008;33

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SHEA/IDSA Practice Recommendations

Basic Practices:
Use a checklist¹

Marschall J, et al. ICHE 2008;29:S22-30.

Section	Action	Recommendation	Full Description	Implemented?
Before Insertion	Educate healthcare personnel	A-II	Healthcare personnel should be educated on the importance of central line insertion and maintenance practices.	Yes... No...
	At Insertion			
Before Insertion	Use a checklist	B-II	Use a checklist to ensure that all steps of the insertion process are followed.	Yes... No...
	Perform hand hygiene	B-II	Perform hand hygiene before and after the procedure.	Yes... No...
	Avoid using femoral vein	A-I	Avoid using the femoral vein for central line insertion unless no other options are available.	Yes... No...
	Use catheter cart or kit	B-II	Use a catheter cart or kit to transport and store the central line insertion kit.	Yes... No...
	Use maximal barrier precautions	A-I	Use maximal barrier precautions during central line insertion.	Yes... No...
	Use CHG skin prep	A-I	Use chlorhexidine gluconate (CHG) for skin preparation.	Yes... No...
After Insertion	Disinfect hubs, connectors, ports	B-II	Disinfect hubs, connectors, and ports with an antiseptic solution.	Yes... No...
	Remove unnecessary catheters	A-II	Remove unnecessary catheters as soon as possible.	Yes... No...
	Change transparent dressing every 7-9 days	A-I	Change transparent dressings every 7-9 days.	Yes... No...
	Replace administration sets every 96 hours	A-II	Replace administration sets every 96 hours.	Yes... No...
Special approaches for the prevention of CLABSI	Perform CLABSI surveillance	B-II	Perform CLABSI surveillance to monitor infection rates.	Yes... No...
	Use antimicrobial-impregnated catheters	A-II	Use antimicrobial-impregnated catheters when appropriate.	Yes... No...
	Use antimicrobial locks	A-I	Use antimicrobial locks to prevent catheter-related infections.	Yes... No...

Developing a Physician Champion—Prevention Should Be The Focus of Clinicians, Not Just Infection Control Personnel.

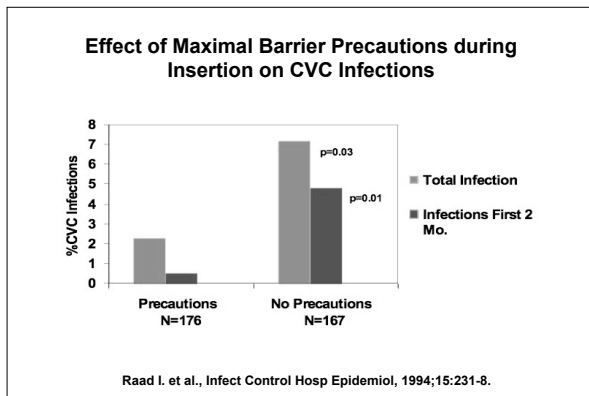
CENTRAL LINE INSERTION BUNDLE COMPLIANCE By Doctors

DOCTOR	n of CL Insertions	Full Barrier Precautions	Hand Hygiene	Removal Date	Insert Chlorhex	Used Checklist
A	25	16 (64%)	17 (68%)	6 (24%)	19 (76%)	6 (24%)
B	13	13 (100%)	13 (100%)	2 (15%)	9 (69%)	6 (46%)
C	3	3 (100%)	2 (67%)	0 (0%)	2 (67%)	1 (33%)
D	5	5 (100%)	5 (100%)	0 (0%)	4 (80%)	4 (80%)
E	4	4 (100%)	3 (75%)	0 (0%)	3 (75%)	2 (50%)
F	3	2 (67%)	3 (100%)	0 (0%)	2 (67%)	2 (67%)

Basic Practices:
Use Catheter Cart or Kit¹

¹ Marschall J, et al. Strategies to prevent Central Line-Related Bloodstream Infections in Acute Care Hospitals. Infect Control Hosp Epidemiol 2008;29:S22-30.

Basic Practices: Use Maximum Barrier Precautions



Basic Practices:
Use CHG Skin Prep¹

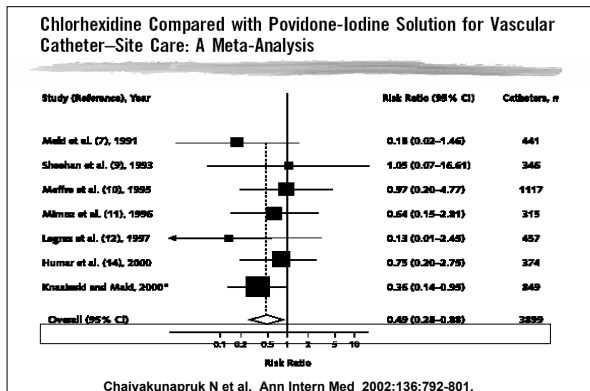
- Apply 30 seconds with friction
- Allow 30 seconds to dry

Marschall J, et al. ICHE 2008;29:S22-30.

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**Special Approaches
for the Prevention of CLA-BSIs**

CHG Bath	B- II
Coated Catheters	A- I
BIOPATCH Disk	B- I
Antimicrobial Locks	A- I

Marschall J, et al. Infect Control Hosp Epidemiology 2008;29:S22-30.

Special Approaches

Special approaches for the prevention of CLA-BSI are recommended if CLA-BSI Rates are **Higher Than Institutional Goals** despite implementation of the basic CLA-BSI prevention strategies¹

1. Marschall J. et al., Infect Control Hospital Epidemiol 2008;29:S22-30.

Chlorhexidine (CHG) Baths to Reduce Vancomycin-resistant Enterococcus (VRE)

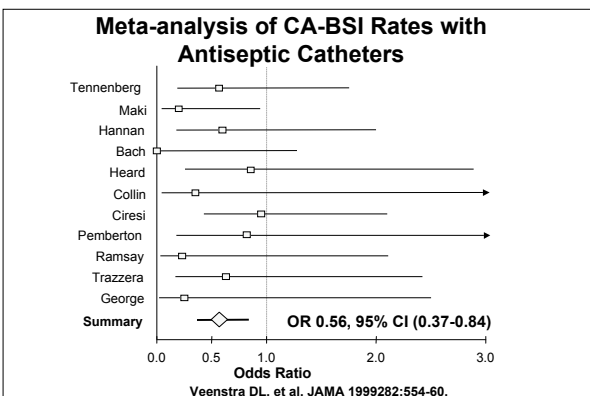
- Study design:** Prospective sequential-group single-arm clinical trial. Compared soap and water to 2% CHG cloth baths/cleansing of teaching hospital medical intensive care unit patients from October 2002-December 2003. Assessed VRE colonization/infection/contamination.
- Results:** 1787 patients treated and tested. CHG resulted in 2.5 log (10) less colonies of VRE on patients skin, less healthcare worker and environmental contamination. VRE acquisition decreased from 26 to 9 per 1,000 patient-days (RR 0.4; 95% CI 0.1-0.9).

Vernon MO, et al. Arch Intern Med 2006;166:306-12.

Daily Chlorhexidine (CGH) Bathing and MRSA, VRE and Bloodstream Infections (BSIs)

- Study design:** Before/after (6 months) study of soap and water vs. CHG solution daily bathing on MRSA or VRE acquisition and BSI at six intensive care units at four academic centers.
- Results:** CHG bathing resulted in a decrease in: MRSA acquisition of 32% (5.04 vs. 3.44 per 1000 patient-days, p=0.046), VRE acquisition of 50% (4.35 vs. 2.19 per 1000 patient-days, p=0.008), of VRE-BSI (p=0.02), and of VRE-BSI in VRE-colonized patients (p=0.035).

Climo MW, et al. Crit Care Med 2009;37:1858-65.



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Prevention: Impact of Coated Catheters

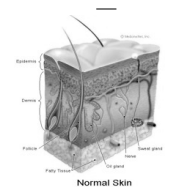
Meta-analysis of published studies

Nº of studies	0.03	0.1	0.3	1.0	RR (95% CI)	NNT
18 colonization			+		0.60 (0.49-0.74)	8
16 bloodstream infections			+		0.64 (0.46-0.88)	55
6 >1 week			+		0.35 (0.16-0.67)	28
9 <1 week			+		0.82 (0.56-1.21)	122

Walder B, et al., *Infect Control Hosp Epidemiol.* 2002;23:748-56.

Microbiology of the Skin

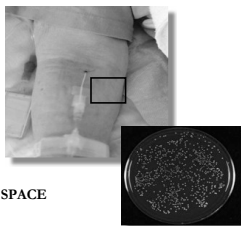
- 80% of the resident bacteria exist within the epidermis
- 20% are found in biofilms within hair follicles and sebaceous glands
- Complete re-colonization can occur within 18 hours of antiseptic application



Ryder, MA. Catheter-Related Infections: It's All About Biofilm. *Topics in Advanced Practice Nursing eJournal.* 2005;5(3) ©2005 Medscape Posted 08/18/2005. <http://www.medscape.com/viewarticle/508109>

Basic Practices: Avoid using Femoral Vein¹ Catheter Entry Site Matters

- Skin surface microbial density varies at different body sites and between genders
- Normal microbial colony counts at the antecubital space are 10 to 20 CFU per cm²

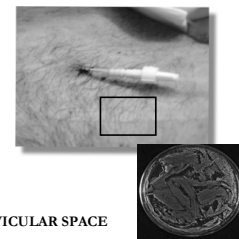


ANTECUBITAL SPACE

1. Marschall J, et al., *Infect Control Hospital Epidemiol* 2006;29:522-30
 2. Ryder M. *JPEN.* 2006;30:S82-93.
 Photo contributed by Marcia Ryder PhD MS RN

Basic Practices: Avoid using Femoral Vein Catheter Entry Site Matters

- Skin surface microbial density is highest on the skin at the femoral, jugular, and subclavian sites
- Normal microbial colony counts at the subclavicular space are 10³ - 10⁴ CFU per cm²



SUBCLAVICULAR SPACE

1. Marschall J, et al., *Strategies to prevent Central Line Associated Bloodstream Infections in Acute Care Hospitals.* *Infect Control Hospital Epidemiol* 2006;29:522-30
 2. Ryder M. Evidence-based practice in the management of vascular access devices for home parenteral nutrition therapy. *JPEN.* 2006;30(1):S82-93. Photo contributed by Marcia Ryder, PhD, MS, RN

CHG-impregnated Patch (BioPatch) Randomized Controlled Trials

Only BioPatch[®] has extensive clinical experience – over 15 years

Author	Year	Meeting/Journal	No. of Patients
Timsit	2009	<i>Journal of the American Medical Association</i>	1,636
Garland	2001	<i>Pediatrics</i>	705
Ruschulte	2008	<i>Annals of Hematology</i>	601
Maki	2000	Fortieth Interscience Conference of Antimicrobial Agents and Chemotherapy	589
Honeycutt	2007	APIC 34th Annual Education Conference & International Meeting	342
Levy	2005	<i>Pediatric Infectious Disease Journal</i>	145
Egol	2005	<i>Journal of Bone and Joint Surgery</i>	118
Chambers	2005	<i>Journal of Hospital Infection</i>	112
Shapiro	1990	<i>Anesthesiology</i>	57
Mann	2001	<i>Anaesthesia and Intensive Care</i>	55
Hanzaki	1999	<i>Journal of Hospital Infection</i>	50
Wu	2008	<i>International Wound Journal</i>	40
Karwowska	1995	<i>Pediatric Research</i>	35
Roberts	1998	<i>Australian Critical Care</i>	33

- Over 14 randomized controlled trials involving 4518 patients and other evidence-based studies.

Does the BioPatch Enhance CVC-BSI Prevention in Patients with Impregnated Catheters?

- Study design:** Prospective, randomized, open, controlled study in cancer chemotherapy patients requiring central venous catheters (CVC) for >5 days between January 2004 and January 2006. All patients had a chlorhexidine and silver sulfadiazine-impregnated triple lumen CVC. Randomized to CHG-sponge vs. standard dressing. Independent observation of site.
- Results:** 601 patients with 9,731 CVC-days. Mean CVC duration: 16.6 days (treatment) vs. 15.8 days (control). Mean neutropenia: 7.5 days (treatment) vs. 6.9 days (control). CVC-related infections: 34/301 (11.3%) in control vs. 19/300 (6.3%) in CHG-sponge group (p=0.016, RR=0.54). CVC-related infections significantly reduced at internal jugular vein-inserted CVCs (P=0.018).
- Summary:** The use of the CHG-sponge (BioPatch) reduced CVC-related infections (54%) even when CHG-silver impregnated catheters were used.

Reschulte H, et al. *Ann Hematol* 2009;88:267-72.

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Increased BSI Rate Temporally Associated With Switching From A Split Septum to Mechanical Valve Needleless Device in a Long-Term Acute Care Hospital

- **Study location:** 40 bed long-term acute care hospital.
- **Split septum (SS) period:** January 2002-December 2003.
- **Mechanical valve (MV) period:** January 2004-October 2005.

	SS Period	MV Period	RR	95% CI	P-value
BSI Rate*	1.79	5.41	3.02	2.62-3.39	<.0001
GNB-BSIs	8%	39.5%	4.93	1.27-19.19	.0006

*BSI rate per 1,000 catheter days; BSI rate has decreased since returning to a split septum needleless device.

Salgado C et al. ICHE 2007;28:684-8.

Recommendations for Implementing Prevention and Monitoring Strategies: Approaches that should not be considered a routine part of CLA-BSI prevention

- Do not use antimicrobial prophylaxis for short-term or tunneled catheter insertion or while catheters are in situ (A-I)
- Do not routinely replace CVCs or arterial catheters (A-I).
- Do not routinely use positive-pressure needleless connectors with mechanical valves before a thorough assessment of risks, benefits, and education regarding proper use (B-II).

Marschall J. et al. Strategies to prevent Central Line Associated Bloodstream Infections in Acute Care Hospitals. Infect Control Hospital Epidemiol 2008;29:S22-30.

Keystone Project

- **Study design:** Intervention cohort study in 108 Michigan Intensive care units (ICUs) over 18 months. Comparison of CVC-BSI rates before, during, and after intervention.
- **Results:** 103 ICUs. 1,981 months of ICU data and 375,757 catheter-days.

Median CVC-BSI Rates per 1,000 CVC-days

Baseline	3 Months	IRR	16-18 Months	IRR
2.7	0	0.62	1.4	0.34

Conclusion: An evidence-based intervention resulted in a large and sustainable decrease (up to 66%) in CVC-BSI rates that was maintained for 18 months.

Pronovost P. et al NEJM 2006;355:2725-32

Ventilator-associated Pneumonia

Ventilator-associated Pneumonia (VAP) Background

- VAP is the most common healthcare-associated infection in critical care patients.
- Risk factors for VAP include age, chronic obstructive lung disease, trauma, gastric aspiration, duration ventilation, elevated gastric pH, etc.
- 10-20% of patients ventilated for >48 hrs will develop VAP.
- 10-15 episodes of VAP per 1,000 ventilator-days (approximately 1% per day of ventilation).



Ventilator Management Changes—The Bundle.

- Chlorhexadine on the unit
- Oral care product
- Sedation reduction vs. Sedation vacation
- Using deep vein thrombosis (DVT) and peptic ulcer disease (PUD) prophylaxis prevent risk for vent patients
- Using ventilator weaning protocol
- Continuous aspiration of subglottic secretions

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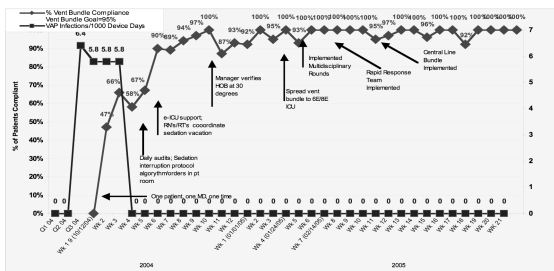
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VENTILATOR BUNDLE COMPLIANCE AUDIT TOOL									
Nursing Audit for patient's requiring mechanical ventilation									
Directions: Please complete the following audit on any patient who has required Mechanical Ventilation for 24 hours or longer									
PATIENT NAME/INFORMATION (ADDRESSOGRAPH)	DATE	CHECK BOX IF CRITERIA MET FOR THE DAY							COMMENTS
		HOW 2-4 DEGREES	DIRY PROPHYLAXIS	RAO PROPHYLAXIS	DAILY RESPIRATOR INTERCHANGES	DAILY ASSESSMENT OF HEADSUPPORT	ORAL CARE	NEBULIZATION	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Oral Decontamination with CHG

- Koeman M et al.** (AJRCCM 2006;173:1348-55): Randomized double blind placebo controlled trial of placebo vs. 2% CHG vs. 2% CHG/2% Colistin (CHG/COL) in patients ventilated for >48 hours. Results: Compared with placebo, the risk of VAP was 65% for CHG (Hazard ratio [HR]=0.352; 95%CI: 0.16-0.79, p=0.012) and 55% for CHG/COL (HR 0.454; 95%CI 0.22, 0.925, p=0.003).
- Tantipong H et al.** (ICHE 2008;29:131-6): RCT (2%CHG vs. Saline, 4 times per day) and meta-analyses. Results: Incidence of VAP: 5/102 (5%) in CHG vs. 12/105 (11.4%) in Saline group: p=.08. Rate per 1,000 Ventilator-days: CHG: 7; Saline 21; p=.04. Meta-analysis of 2 RCTs: Overall Relative Risk for VAP in CHG group = 0.53 (95%CI, 0.31-0.90, p=.02).
- Sona CS et al.** (JICM 2009;24:54-62): Pre- vs. Post-intervention observational study. Intervention: cleansing teeth with sodium monofluorophosphate paste and brush, rinse with water, then application of 0.12% CHG solution twice daily. Results: Pre-intervention: VAP rate per 1,000 vent-days: 5.2 vs. 2.4 in intervention period: p=0.04. Staff compliance = 81%.
- Chan EY et al.** (BMJ 2007;334:889): Systematic review and meta-analysis. 11 trials with 3242 patients. Oral antibiotics: 1098 patients—no significant reduction in VAP. Oral antiseptics: significant reduction in VAP (RR 0.56, 95%CI: 0.39-0.81).

Data Feedback – New Way Vent Bundle Compliance and VAP Infection Rates, Hospital A



Comparative Trial of the Silver-Coated Endotracheal Tube

- Objective:** To determine whether a silver-coated endotracheal tube reduces the incidence of microbiologically confirmed VAP.
- Study design:** Prospective, randomized, single-blind, controlled study in 54 North American centers. 9417 adult patients (>18 years) expected to require mechanical ventilation for >24 hours were randomized. VAP incidence was based on quantitative bronchoalveolar lavage fluid culture with $\geq 10^4$ colony-forming units/mL.
- Intervention:** Patients were assigned to undergo intubation with 1 of 2 high-volume, low-pressure endotracheal tubes, similar except for a silver coating on the experimental tube.
- Results:** Rates of microbiologically confirmed VAP were lower in the silver group than controls (3.8% vs. 4.8%, P = .03). The silver-coated endotracheal tube was associated with delayed occurrence of VAP (P = .005). No statistically significant between-group differences were observed in durations of intubation, ICU stay, and hospital stay; mortality; and frequency and severity of adverse events.
- Conclusion:** Patients receiving a silver-coated endotracheal tube had a statistically significant reduction in the incidence of VAP and delayed time to VAP occurrence compared with those receiving a similar, uncoated tube.

Koleff MH et al. JAMA. 2008;300:805-13.

The Importance of Nursing Education

- Study design:** European intensive care unit (ICU) nurses were tested on knowledge of evidence-based guidelines for preventing VAP. A validated multiple-choice questionnaire was distributed in 22 European countries from October 2006–March 2007.
- Results:** There were 3329 questionnaires (response rate 69.1%). The average score was 45.1%.
 - 55% knew that the oral route is recommended for intubation;
 - 35% knew that ventilator circuits should be changed for each new patient;
 - 38% knew that heat and moisture exchangers were the recommended humidifier type, but only 21% knew that these should be changed once weekly;
 - 46% recommended closed suctioning systems; 18% knew that these must be changed for each new patient;
 - 51% recognized that subglottic secretion drainage reduced VAP;
 - 57% recognized that kinetic beds reduce VAP incidence; and
 - 85% knew that semi-recumbent positioning prevents VAP.
- Professional seniority and number of ICU beds were shown to be independently associated with better test scores.

Labeau S. et al., J Hosp Infect. 2008;70:180-5

Prevention of VAP

- Standard infection control practices (e.g., hand hygiene).
- Minimizing duration/intensity of sedation and device exposure.
- Positioning patient in semi-recumbent position (40 degree).
- Appropriate use of enteral feeding, antibiotics and selected medical devices.
- Use of sterile water for irrigation.
- Closed suction system.
- Mouth care—chlorhexidine mouth/teeth cleaning.

Safdar N et al CCM 2005;33:2184; Patel PJ et al SRCCM 2002;23:415-425; Hugonnet S et al ICHE 2004;25:1090-1096.

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Hot Off the Press - A Review of the Evidence

Dr. William Jarvis, Jason and Jarvis

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Methicillin-resistant Staphylococcus aureus (MRSA)

SUPERBUG 'TO KILL 150,000'

Minister orders his health chief: Solve deadly NHS crisis

URGENT action to combat the killer hospital bug. MRSA was described last night by Health Secretary John Hare.

He said as a leading expert said that the infection could kill 150,000 patients over the next two years.

Dr Hare asked the "big" Medical Officer, Sir Liam Donaldson, to lead a new mission to beat the spread of MRSA, "as a

EXCLUSIVE by **Luigi Johnston** and **Michael Kepp**

major of urgency". The report is expected to be published in the next few days.

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TURN TO PAGE 5

KILLER STAPH

Experts say U.S. deaths from 'superbug' may surpass AIDS

By **LINDSEY TANNER**, AP Medical Writer 10/17/07 JCP

INSIDE Hampton Elementary staph infections/4B

CHICAGO — It now appears a dangerous type of staph infection is probably killing more Americans each year than AIDS. It's resistant to standard antibiotics, and the government reports in its first broad look at invasive disease caused by this superbug that more than 90,000 Americans are sickened by it annually.

The drug-resistant germ goes by the nickname MRSA, short for methicillin-resistant Staphylococcus aureus.

"The rate of invasive MRSA was an astounding 31.8 per 100,000," according to an editorial published with

Invasive MRSA (mostly HA-MRSA and mostly BSI) kills nearly 19,000 patients annually in the United States.

Annual Numbers of Deaths (U.S.)	
Cause	Number
MRSA (invasive)	~19,000
HIV/AIDS	~15,000
Parkinson's	19,544
Homicides	18,124
Injuries at work	5,113
Infant mortality	9,070

See STAPH, Page 5A

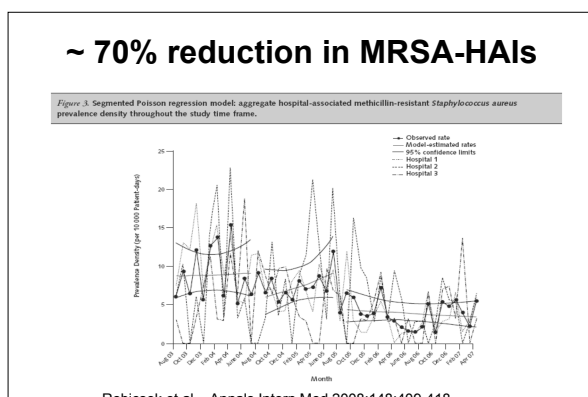
Recommendations For Preventing MRSA Transmission-Active Detection and Isolation (ADI)

- Conduct a risk assessment;
- Active surveillance testing to identify MRSA-colonized patients;
- Isolation (cohorting) of colonized and infected patients;
- Hand hygiene—before/after patient/environment contact;
- Gown and glove, if patient or contaminated environmental contact anticipated; and
- Routine environmental cleaning.

Does True Universal MRSA Screening Reduce Transmission and MRSA Infections?

Study Design: Observational, prospective interventional study with universal screening using MRSA-PCR on all admissions to three hospitals (total: 850 beds and 40,000 admissions per year) in Evanston, Ill.

- **Compared:** Passive surveillance (clinical detection-12m); Targeted surveillance cultures (clinical culture + high risk = ICU-12m); or Universal patient screening-21m.
- August 2005 to September 1, 2006.
- **Intervention:** Nasal screening, MRSA+ contact isolation, topical decolonization (mupirocin).
- Poisson and segmented regression models used to compare prevalence density. Robicsek et al. *Annals Intern Med* 2008;148:409-418



The Veteran's Hospital Administration (VHA) MRSA Control Program

- The national initiative focuses on implementing the VHA MRSA Bundle which consists of four essential elements (ADI):
- Active Surveillance Testing [AST](Admission/Transfer/Discharge Swabbing)
- Hand Hygiene
- Contact Precautions
- Cultural Transformation (Leadership and Staff Engagement)
- Consistent use of the VHA MRSA Bundle had been shown to markedly reduce MRSA-related infections in the pilot facilities.
- Phase I: The VHA system began doing universal patient testing in 2006 at its approximately 150 hospitals in ICU patients.
- Phase II of the initiative began in March 2007 and was a national roll-out including all VHA medical facilities with all patients (ICU and non-ICU).
- MRSA prevalence on admission ranged from 5% to 22% (clinical culture 1-1.5%; AST 9%-12%).

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VHA MRSA Control Program Results

Year	FY06	FY07	FY08	FY09
ICU-MRSA-HAI Rate*	1.37	1.36	1.20^	0.79^
Non-ICU MRSA Rate			0.54	0.378#

MRSA-CVC-BSI rate: 0.4 to 0.18 per 1000 CVC-days: P=0.02

In March 2009, the VA expanded the MRSA control program to their long-term care facilities nationwide.

*Rate per 1,000 bed-days 07 vs. 08: P=0.04; 08 vs. 09: P<0.001; # p=0.02

Universal surveillance by PCR for *S. aureus* followed by decolonization

- Randomized trial
 - PCR identification of *S. aureus* in patients admitted to the hospital.
 - Decolonization with nasal mupirocin and chlorhexidine bathes.

Kluytmans et al. ICAAC 2008, Abstract #: K-1711

	mupirocin and chlorhexidine (n=504)	placebo (n=413)	RR (95% CI)
primary outcome			
nosocomial <i>S. aureus</i> infections - no (%)	17 (3.4)	32 (7.7)	0.42 (0.23-0.75)
source of <i>S. aureus</i> infection - no (%)			
endogenous	12 (2.4)	25 (6.1)	0.39 (0.20-0.77)
exogenous	4 (0.8)	6 (1.5)	0.55 (0.16-1.92)
unknown	1 (0.2)	1 (0.2)	
localization of <i>S. aureus</i> infection - no (%)			
surgical site (deep)*	4 (0.9)	16 (4.4)	0.21 (0.07-0.62)
surgical site (superficial)*	7 (1.6)	13 (3.5)	0.45 (0.18-1.11)
lower respiratory tract	2 (0.4)	2 (0.5)	0.82 (0.12-5.78)
urinary tract	1 (0.2)	0 (0)	
bacteremia	1 (0.2)	1 (0.3)	
soft tissue	2 (0.4)	0 (0)	

* calculated for surgical patients only. Number of surgical patients: n=441 in mupirocin/chlorhexidine group, n=367 in placebo group

Kluytmans et al. ICAAC 2008, Abstract #: K-1711

Conclusions

- Many, if not most healthcare-associated infections (HAIs) are preventable, with the implementation of simple, evidence-based interventions.
- Implementation of evidence-based prevention interventions, including the latest technology—which may initially cost more but also save more by reducing HAIs, should be a high priority for all infection control personnel.
- We should all be seeking ZERO Tolerance for HAIs.

Thank you!



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21 Sep. 09	(Free British Teleclass) <i>Live Broadcast from the Infection Prevention Society Conference</i> Fifty Years of Resistance Speaker: Prof. Gary French, Guy's & St. Thomas' Hospital, England
22 Sep. 09	(Free British Teleclass) <i>Live Broadcast from the Infection Prevention Society Conference</i> The Pursuit of Excellence During a Global Pandemic Speaker: Prof. Robert Pratt, Thames Valley University
23 Sep. 09	(Free British Teleclass) <i>Live Broadcast from the Infection Prevention Society Conference</i> Hot Off the Press - A Review of the Evidence Speaker: Dr. William Jarvis, President, Jason and Jarvis Associates
23 Sep. 09	(Free British Teleclass) <i>Live Broadcast from the Infection Prevention Society Conference</i> Moving on from Audit - Quality Improvement Tools for Infection Prevention Speaker: Dr. Neil Wigglesworth, Salford Royal NHS Trust

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