

Universal Decolonization Horizontal vs Vertical Interventions to Reduce Healthcare- Associated Infections

Ed Septimus, MD, FACP, FIDSA, FSHEA
Medical Director, Infection Prevention and Epidemiology
Clinical Services Group, HCA
CI Professor Internal Medicine Texas A&M Medical School
Professor, Distinguished Senior Fellow, School of Public Health, George
Mason University
edward.septimus@hcahealthcare.com



Disclosures

Conducting clinical trials and studies in which participating hospitals are receiving contributed product from Sage Products, Clorox, and Molnlycke

Introduction

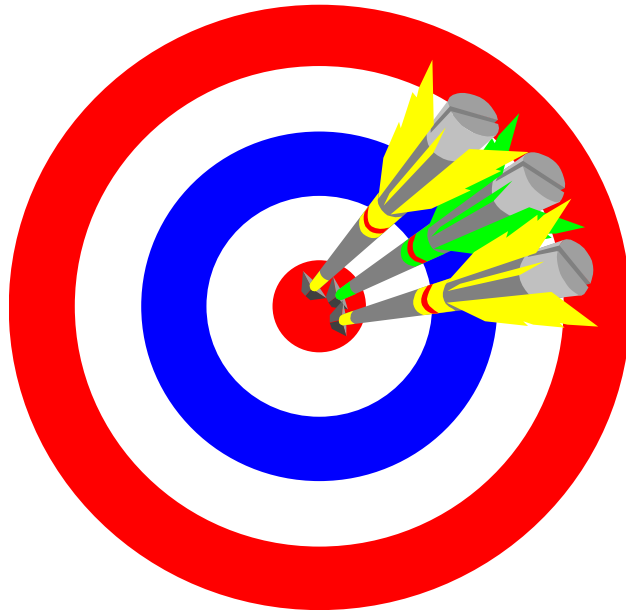
Healthcare Associated Infections (HAIs)

In 2000, HAIs became a national priority

- 1.7 million HAI cases/year ¹
- 100,000 deaths/year
- Top 10 cause of death in US
- \$6.5-10 billion annually ²
- Most preventable



“The greatest danger for most of us is not that our aim is too high and we miss it, but that our aim is too low and we reach it .”



- Michelangelo

Agenda

- Introduction: Overview of impact and trends in HAIs
- Infection prevention approaches
- Vertical vs Horizontal Approaches to HAI Prevention
- Rationale and impact of CHG bathing on HAIs

HAI and Cost

HAI Infections ¹ (percent)	Estimated Costs ² (\$)	LOS ² (days)
Pneumonia (21.8)[†]	40,144(VAP)	13.1
Surgical-site infection (21.8)	20,785	11.2
GI infection ‡ (17.1)	11,285(<i>C. diff</i>)	3.3
UTI(12.9)[¥]	896 (CAUTI)	Not reported
Primary BSI (9.9)[§]	45,814 (CLABSI)	10.4

1. *N Engl J Med* 2014; 370:1198-1208

2. *JAMA Intern Med* 2013; 173:2039-2046

† 39.1 % associated with mechanical ventilation

‡ 70.9% *C. difficile*

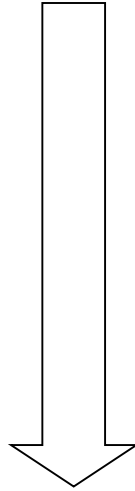
¥ 67.7 % associated with a catheter

§ 84% associated with a central catheter

Annual cost 9.8 billion
Top 5 HAIs ²

Culture change

**“Many infections are inevitable;
some might be preventable”**



**“Each infection is potentially preventable,
unless proven otherwise”**

The Art of the Possible

- **IT IS POSSIBLE to reduce HAIs**
 - 2003: The irreducible minimum by current knowledge: **20%** ¹
 - 2011: The estimated limit of HAI preventability: **55-70%** ²

CLABSI	65-70%
CAUTI	65-70%
SSI	55%
VAP/VAE	55%
- **We must achieve much more**
 - *C. difficile*
 - Can we eradicate MDROs?
 - Antibiotic stewardship

CMS Linking Federal Reimbursement to Clinical Performance

- CMS is implementing three distinct independent programs that have payment tied to the clinical performance of the hospital.
 - Value –Based Purchasing Program
 - Readmissions Reduction Program
 - Hospital Acquired Conditions Reduction Program

2011	2012	2013	2014	2015	2016	2017	2018	2019
		Hospital Value-Based Purchasing (1-2%; Phased in over 4 Years)						
		1.00%	1.25%	1.50%	1.75%	2.00%		
		Hospital Readmissions (1-3%; Phased in over 3 Years)						
		1.00%	2.00%	3.00%				
				Hospital Acquired Conditions (1%)				
				1.00%				

Infection Prevention Approaches

- **Vertical:** Substantially reduces a pathogen specific
 - Active surveillance(e.g. MRSA, *C. difficile*, MDRO)
 - Contact precautions(e.g. MRSA colonization or MRSA, *C. difficile* infection, MDRO)
 - Decolonization (e.g. MRSA)
 - Vaccination (e.g. influenza, Tdap)
- **Horizontal:** Substantially reduces all infections and is not pathogen specific
 - Standard precautions (HH, cough etiquette, PPE, ?universal gloving)
 - Environmental cleaning and disinfection
 - Antimicrobial stewardship
 - Bundles of care (e.g. CLABSI, SCIP, Vent)
 - CHG bathing
 - Selective digestive tract decontamination
 - Behavior modification

Modified Int J of Infect Dis. 1 4S4;2010: S3

HCA Journey

- ABCs MRSA
- REDUCE MRSA
- Research agenda-ABATE

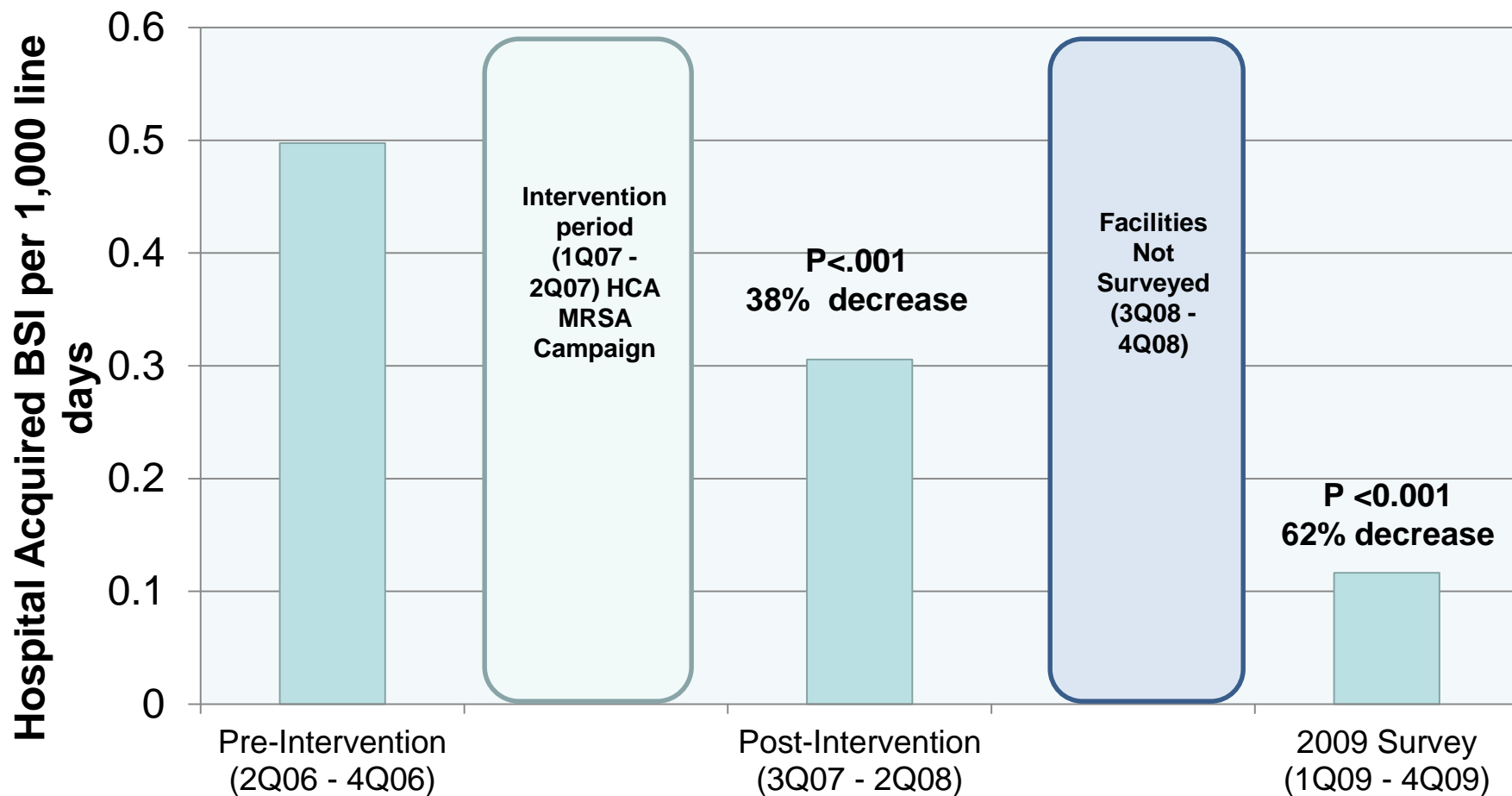


HCA's MRSA Solution: The A,B,Cs...

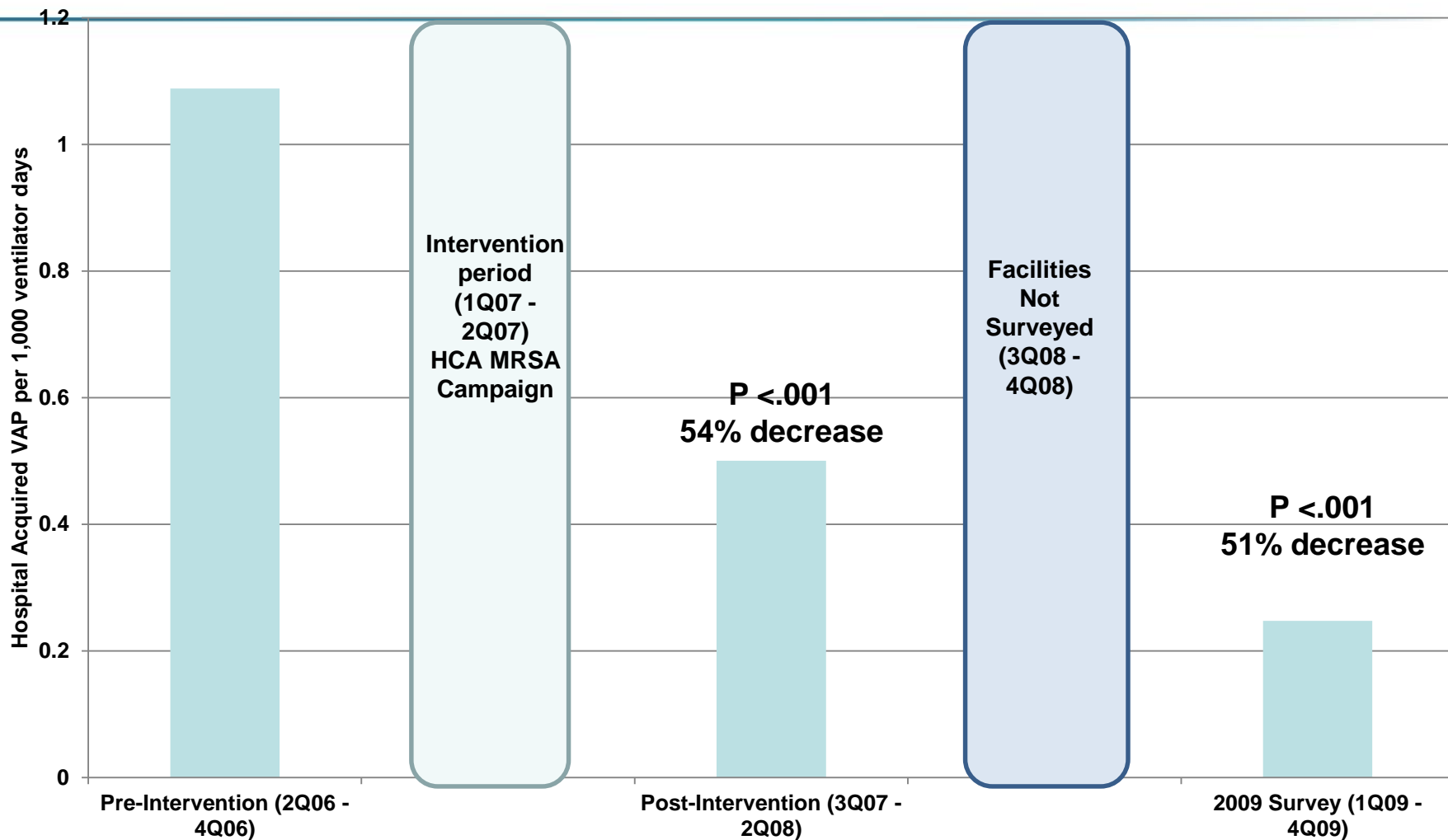
- **A**ctive Surveillance of high risk patients
- **B**arrier Precautions
- **C**ompulsive Hand Hygiene
- **D**isinfection / Environmental Cleaning
- **E**xecutive Championship



Reduction in Healthcare-Associated MRSA Central Line Associated Blood Stream Infections in Adult ICUs



Reduction in Healthcare-Associated MRSA Ventilator Associated Pneumonia in Adult ICUs



HCA's MRSA Solution: The A,B,Cs...

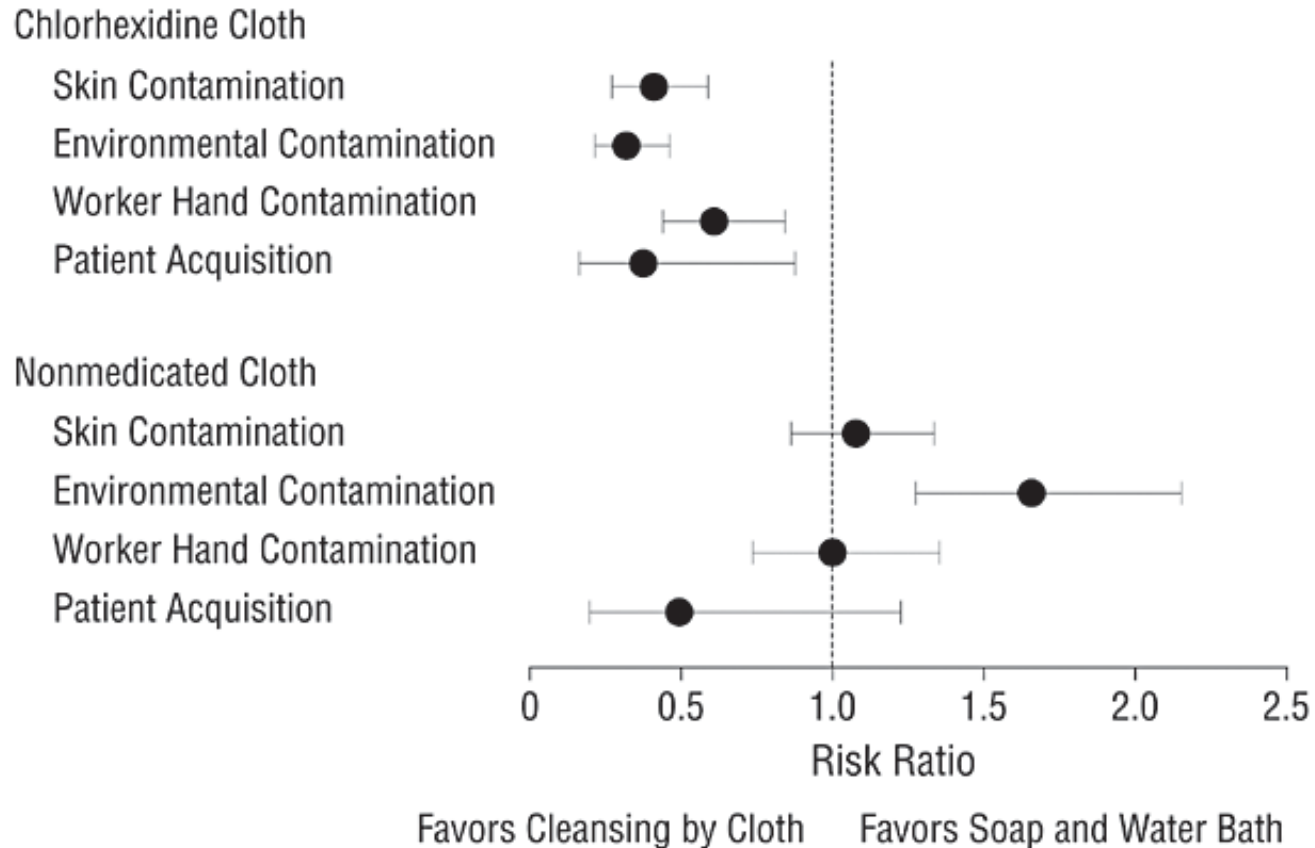
- **Active Surveillance of high risk patients-vertical**
- **Barrier Precautions-±vertical**
- **Compulsive Hand Hygiene-horizontal**
- **Disinfection / Environmental Cleaning-horizontal**
- **Executive Championship-horizontal**

CHG Bathing

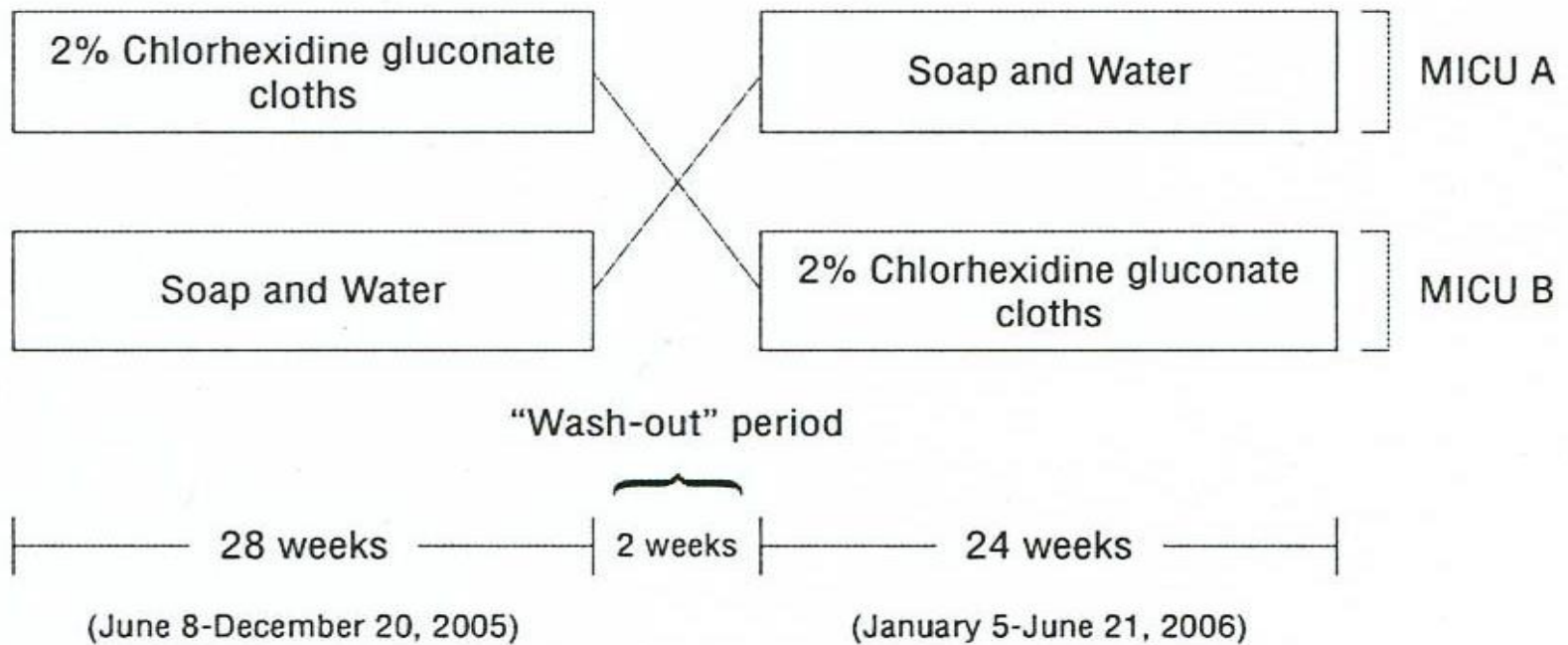
Chlorhexidine Uses

- Dental – gingivitis, periodontal disease
- Central line skin prep
- Surgical skin prep
- Surgical pre-operative bathing
- Wound cleanser
- Bathing to reduce microbial burden and infection

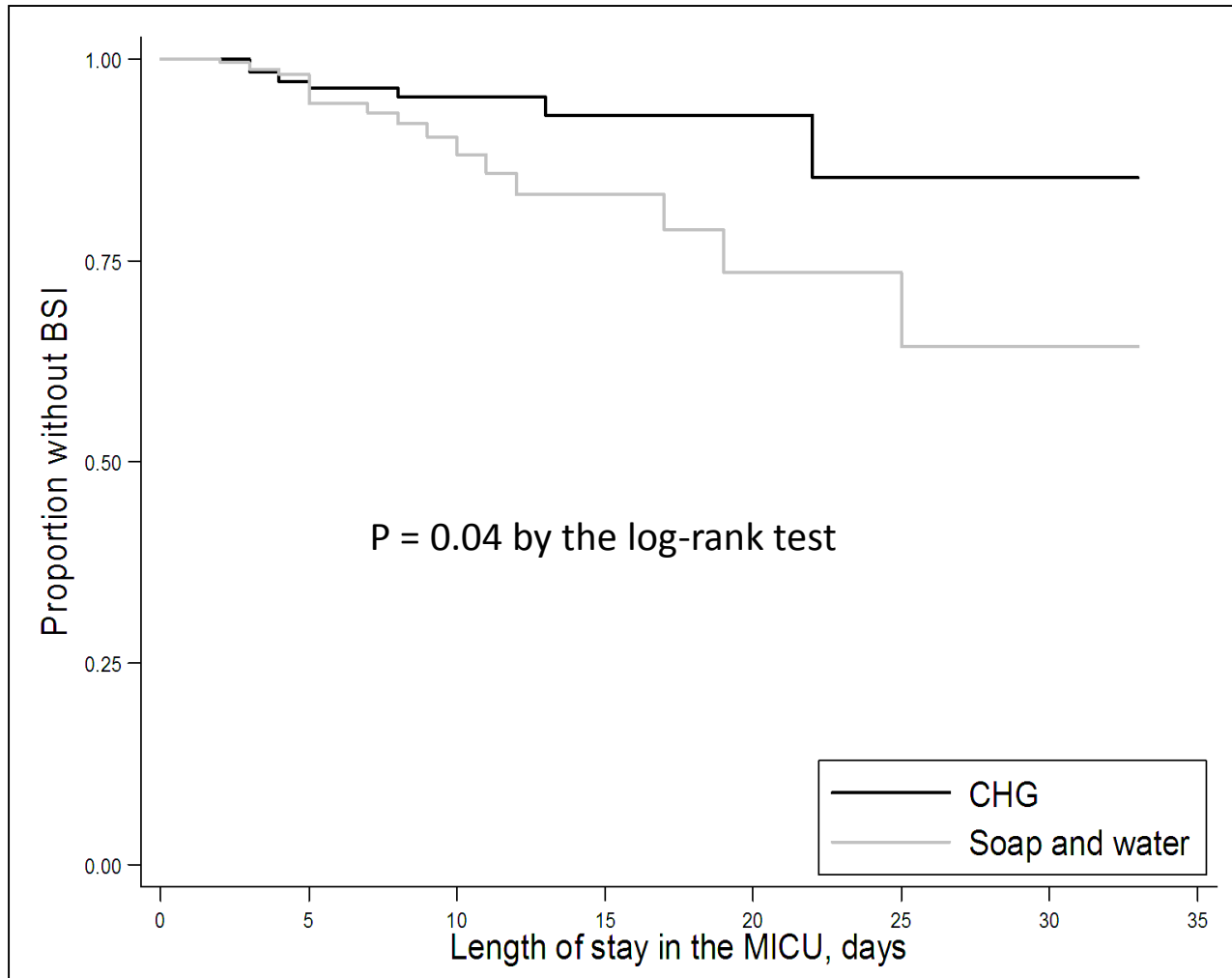
CHG Impact on Skin, Environment, Staff Contamination and VRE Acquisition



Chlorhexidine Prevention of Bloodstream Infections



Chlorhexidine Impact on Central Line Bloodstream Infections



4% CHG Bathing on Multidrug-resistant *Acinetobacter baumannii* (ACBA) Skin Colonization and BSI in an MICU

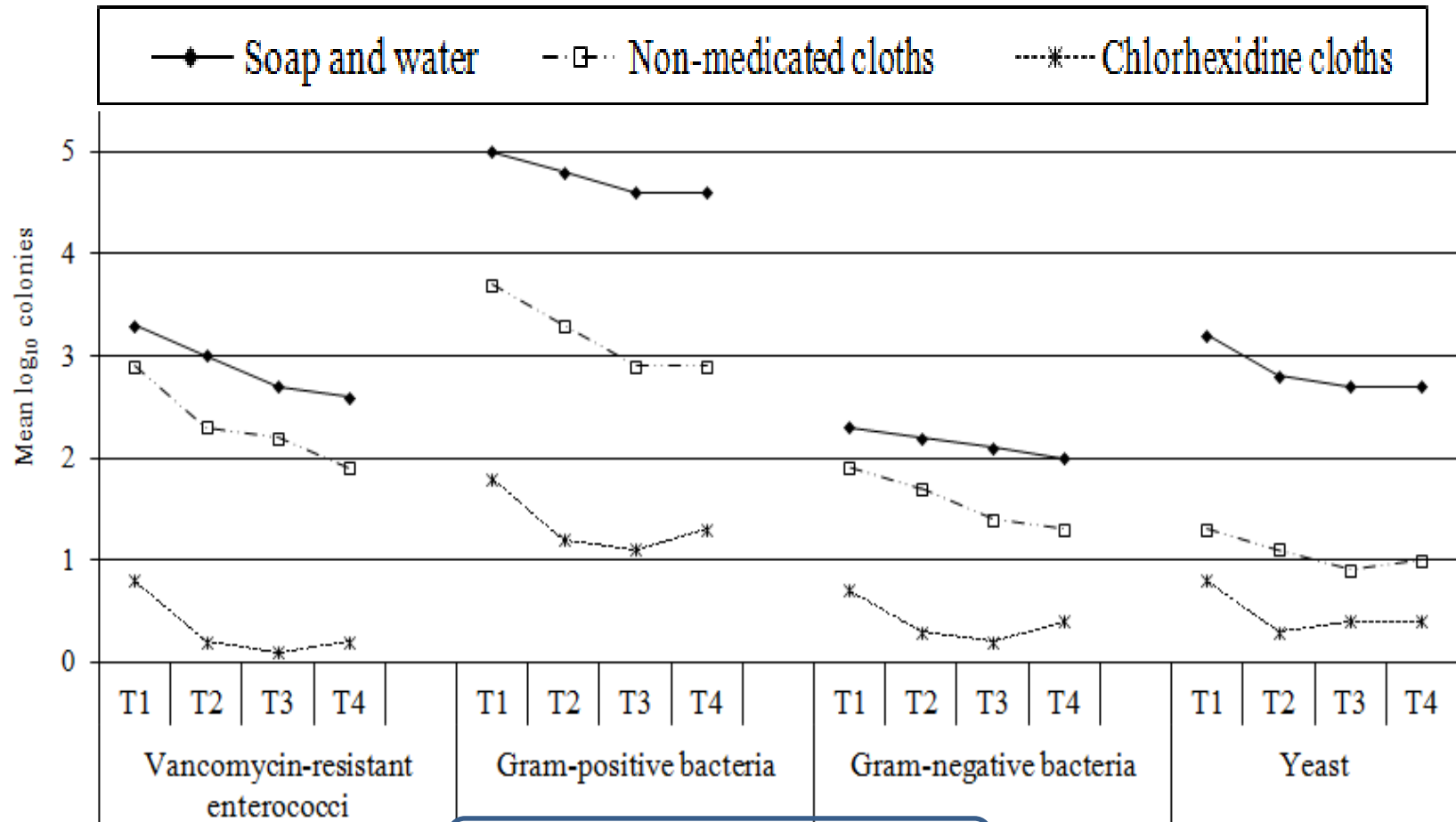
- All patients daily whole-body disinfection with 4% CHG
- Of 320 patients at admission, 55 (17%) ACBA-positive skin swabs
- Prevalence of ACBA skin colonization among remaining patients was 5.5% at 24h and 1% at 48h ($P = 0.002$, OR: 2.4)
- ACBA-BSIs decreased from 4.6 to 0.6 per 100 patients ($P \leq 0.001$; OR: 7.6)
- Daily whole-body CHG disinfection significantly reduced ACBA skin colonization and BSIs

Reduction in MRSA and VRE Acquisition with Chlorhexidine Bathing

- 4 Center pre-post evaluation of adult ICUs
- 6 months of routine soap → 6 months of 4% CHG liquid

	Baseline Period	Intervention Period
Admissions	2670	2650
Total bed days of care	15,472	15,225
Total central venous catheter days ^a	10,062	9,633
Mean length of stay (days)	5.99	5.82
MRSA acquisition		
Number of cases	67	45
Number of eligible patient days	13,300	13,096
Incidence rate ^b	5.04	3.44 (<i>p</i> = 0.046) ^c
MRSA prevalence rate ^b	22.80	21.80
VRE acquisition		
Number of cases	61	30
Number of eligible patient days	13,412	13,610
Incidence rate ^b	4.35	2.19 (<i>p</i> = 0.008) ^c
VRE prevalence rate ^a	17.97	16.75

Bioburden on Inguinal Skin by Cleansing Method



Recent Cluster Randomized Trials

- **Adult ICUs**

- Academic teaching centers (Climo et al)
- Community hospitals HCA (Huang et al)
- 13 European ICUs (Derde et al)
- Single site academic center (Noto et al)

- **Pediatric ICUs**

- Academic teaching centers (Milstone et al)

Decolonization in Academic Adult ICUs

- Multicenter, cluster-randomized, nonblinded crossover trial. Nine intensive care and bone marrow transplantation units in six hospitals were randomly assigned to bathe patients either with no-rinse 2% chlorhexidine–impregnated cloths or with nonantimicrobial washcloths for a 6-month period, exchanged for the alternate product during the subsequent 6 months.
- All units performed active surveillance testing for MRSA and VRE throughout the study period.
- The intervention was associated with a significant reduction in hospital-acquired bloodstream infections (28% lower with CHG $P=0.007$) and reduced acquisition of VRE, but not MRSA
- The effect was greater in patients who were in the unit longer.
- A total of 7727 patients were enrolled during the study.

Decolonization in Academic PICUs

- **10 Pediatric ICUs, 5 academic medical centers, 4957 patients**
 - Randomized cross-over design (6 months each) CHG cloths vs. routine bathing
 - Excluded those with
 - Anticipated LOS \leq 2 days
 - Lumbar drains
 - Severe skin issues
- **Outcome**
 - Incidence of bacteremia was significantly lower with CHG bathing ($P=0.044$)
 - Bacteremia secondary to a central line was significantly lower with CHG bathing ($P=.021$)

Decolonization in 13 European ICUs in 8 Countries

- Three phase study:
 - Phase 1-6 month baseline
 - Phase 2-interrupted time series analysis of universal daily 4% CHG combined with HH for 6 months
 - Phase 3-12-15 month cluster randomized trial comparing conventional screening or rapid screening with contact precautions for identified carriers. (MRSA, VRE, and highly-resistant Enterobacteriaceae)
- Results 8976 patients eligible
 - HH compliance increased from 52% phase 1, 69% phase 2, and 77% in phase 3
 - Improved hand hygiene and chlorhexidine bathing are associated with a reduction in acquisition, mainly through reduced acquisition of MRSA
 - Screening and isolation of carriers did not further reduce acquisition of multidrug-resistant bacteria, whether screening was done with rapid testing or conventional testing.
- Horizontal>Vertical

REDUCE MRSA Trial: Randomized **E**valuation of
Decolonization vs. **U**niversal **C**learance to **E**liminate MRSA

The **NEW ENGLAND**
JOURNAL *of* **MEDICINE**

ESTABLISHED IN 1812

JUNE 13, 2013

VOL. 368 NO. 24

Targeted versus Universal Decolonization to Prevent ICU Infection

Susan S. Huang, M.D., M.P.H., Edward Septimus, M.D., Ken Kleinman, Sc.D., Julia Moody, M.S., Jason Hickok, M.B.A., R.N., Taliser R. Avery, M.S., Julie Lankiewicz, M.P.H., Adrijana Gombosov, B.S., Leah Terpstra, B.A., Fallon Hartford, M.S., Mary K. Hayden, M.D., John A. Jernigan, M.D., Robert A. Weinstein, M.D., Victoria J. Fraser, M.D., Katherine Haffenreffer, B.S., Eric Cui, B.S., Rebecca E. Kaganov, B.A., Karen Lolans, B.S., Jonathan B. Perlin, M.D., Ph.D., and Richard Platt, M.D., for the CDC Prevention Epicenters Program and the AHRQ DECIDE Network and Healthcare-Associated Infections Program*

- Hospital Corporation of America
- Harvard Pilgrim Healthcare Institute/Harvard Medical School
- University of California Irvine
- Rush University
- CDC Prevention Epicenters Steering Committee

Trial Rationale

- MRSA important in healthcare associated infections
 - MRSA and MSSA #1 cause of HAIs in US
 - Risk of *S. aureus* HAI 3-12 fold higher in carriers
 - Dual objective for reduced MRSA: preventing infections in carriers and reduce cross-transmission
- Many quality improvement strategies
 - Screen and isolate
 - Screen, isolate, decolonize
 - Universal decolonization
- No head-to-head comparisons
- Debate of high risk pathogen vs high risk populations

ICHE 2009;30:623-32

CID 2007;44:178-85

CID 2010;50:210-217

Arch Int Med. 2006;166:306-12

Arch Int Med. 2007;167:2073-9

Crit Care Med. 2009;37(6):1858-65

ICHE 2013;34:1-14

J Hosp Infect 2013; 84:13-21

Cluster Randomized Trial

Randomized hospitals and all their adult ICUs to:

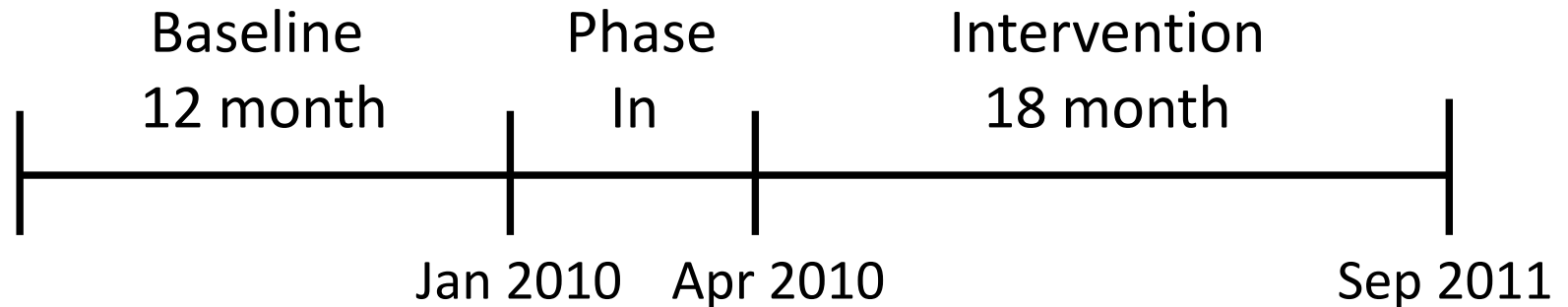
- **Arm 1: Routine Care**
 - Screened all patients; isolated known MRSA+
- **Arm 2: Targeted Decolonization**
 - Screened all patients; isolated if known MRSA+
 - Decolonized if MRSA+
- **Arm 3: Universal Decolonization**
 - No screening; isolated if known MRSA+ or other MDRO
 - Decolonized all

Decolonization Regimens

- **Arm 2: Targeted Decolonization**
 - Nasal mupirocin twice daily for 5 days
 - 2% chlorhexidine cloth baths daily for 5 days
- **Arm 3: Universal Decolonization**
 - Nasal mupirocin twice daily for 5 days
 - 2% chlorhexidine cloth baths daily for ICU duration

Decolonization in Community ICUs

- **74 adult ICUs, 43 hospitals, 74,256 patients**
 - 1 academic center, 42 community hospitals
 - 3-arm cluster randomized trial of hospitals
 - 3 hospitals provide bone marrow transplants
 - 5 hospitals provide solid organ transplants

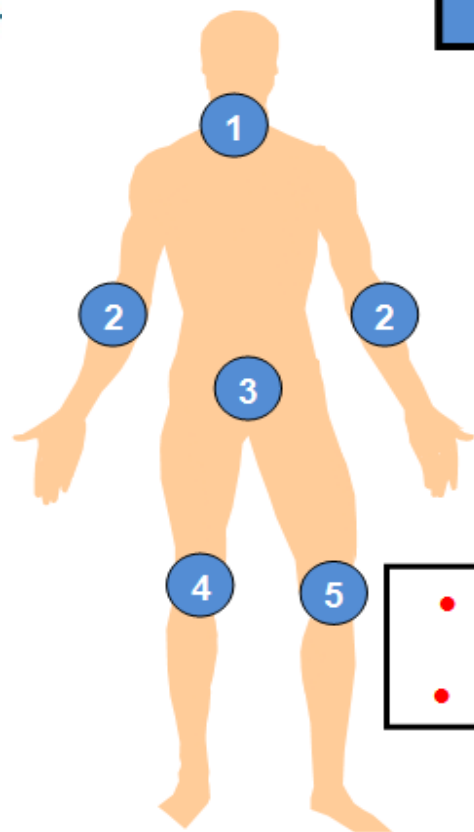


Outcomes

- **Primary**
 - Any MRSA clinical isolate attributed to ICU
- **Secondary**
 - MRSA bloodstream isolate attributed to ICU
 - Any bloodstream isolate attributed to ICU
- **Outcome Definitions**
 - Microbiology results alone
 - > 2d after ICU admit → 2d after ICU discharge

Apply Chlorhexidine WITH FIRM MASSAGE to remove bacteria

USE ALL 6 CHG CLOTHS
Avoid EYES & EAR CANAL

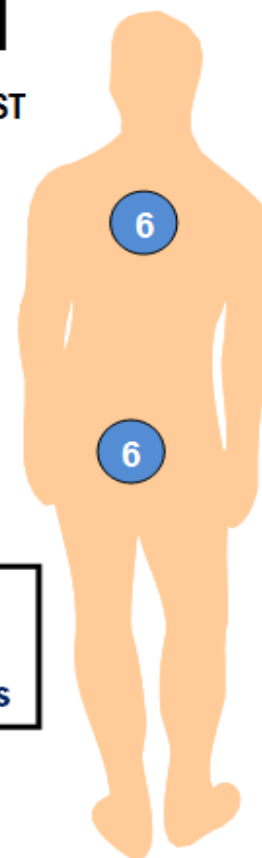


FRONT

- 1 FACE, NECK SHOULDERS & CHEST
- 2 BOTH ARMS & HANDS
- 3 ABDOMEN, GROIN & PERINEUM
- 4 RIGHT LEG & FOOT
- 5 LEFT LEG & FOOT
- 6 BACK, THEN BUTTOCKS

- Clean 6 inches of all tubes, lines, and drains closest to patient with CHG
- Safe on superficial wounds, rash, burns

Skin may feel sticky for a few minutes after CHG application.
Do NOT wipe off. Allow to air dry.



BACK

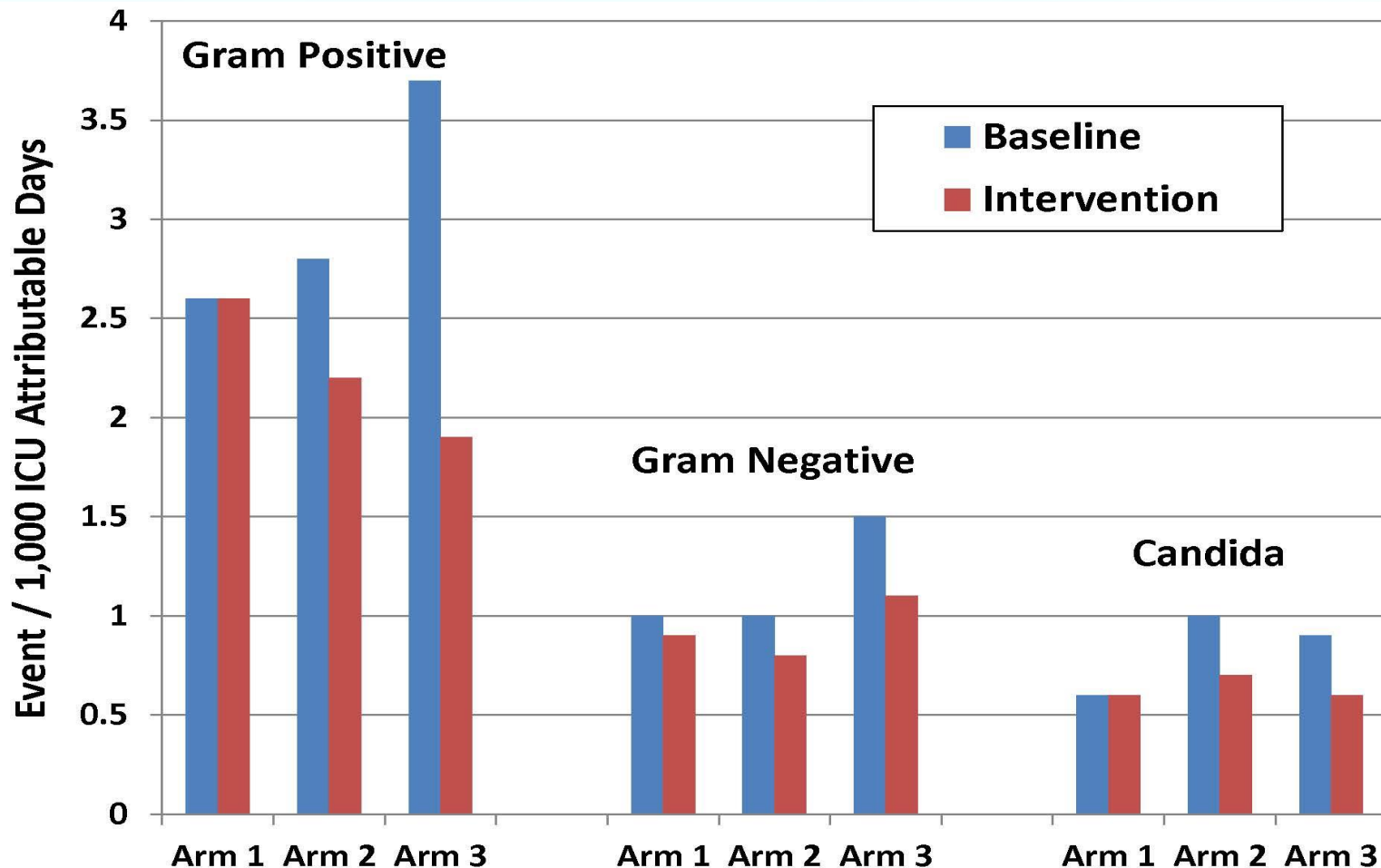
THIS IS a PROTECTIVE BATH
Do not use soap which can inactivate CHG

http://www.ahrq.gov/professionals/systems/hospital/universal_icu_decolonization/index.html

Conclusions for ICU Settings

- Universal decolonization
 - 37% reduction in MRSA clinical isolates
 - 44% reduction in all-cause bloodstream infection
 - Trend in reduction of MRSA bacteremia which was not statistically significant*
 - Required no screening
 - May reduce need for contact precautions
- Targeted decolonization
 - 22% reduction in all-cause bloodstream infection
- **Horizontal vs Vertical Approaches**
 - **Universal better than targeted**

Bloodstream Reduction by Pathogen Type



Elevated baseline bloodstream rate in Arm 3 maybe related to higher acuity.

Arm 3 had 2 of 3 BMT units in the trial, and 3 of 5 solid organ transplant units.

Secondary Analyses

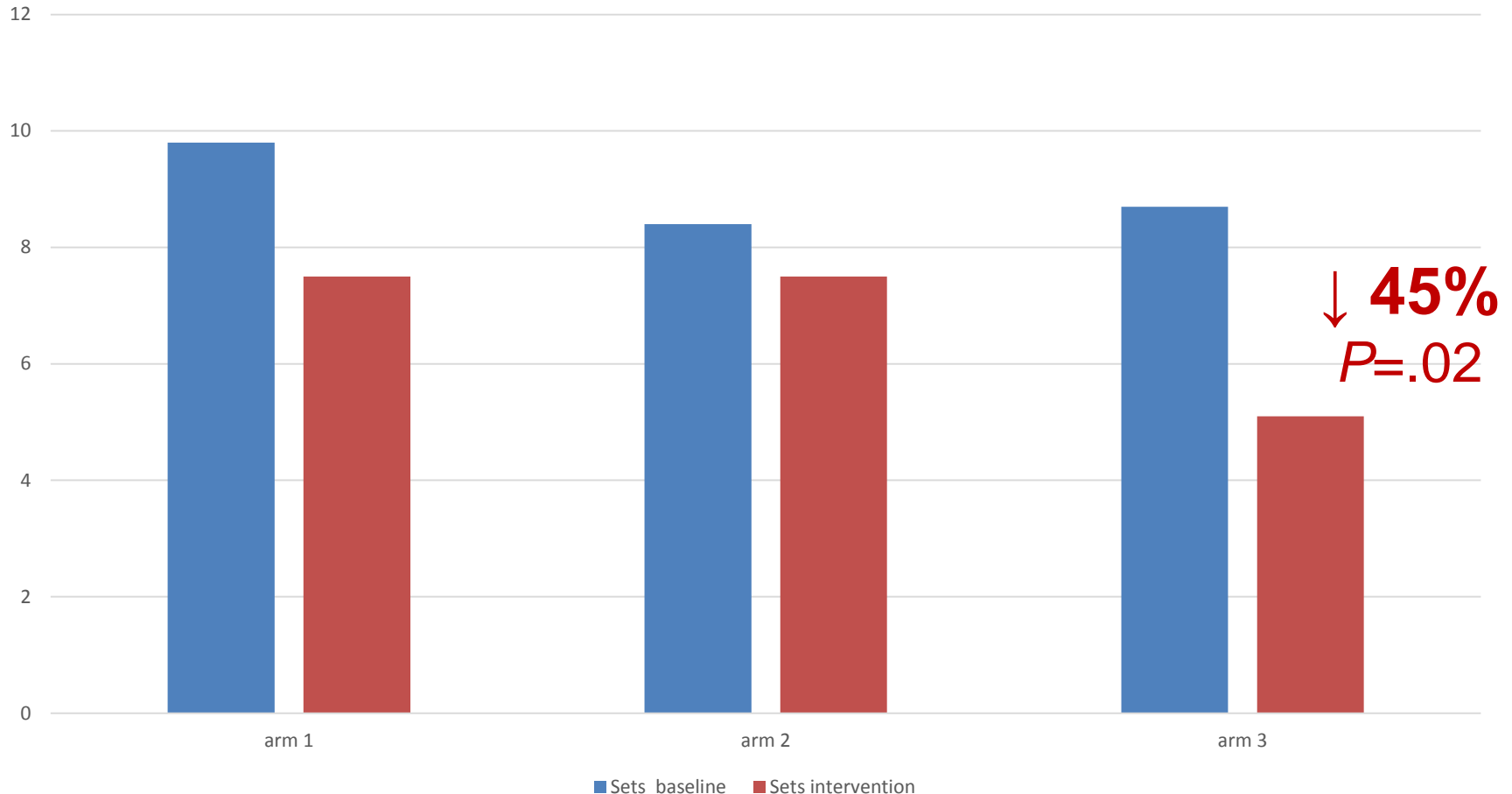
- Blood contamination
- Urinary tract infections
- Cost effectiveness analysis
- Emergence of resistance to mupirocin/chlorhexidine

Impact on Blood Culture Contamination

Does Chlorhexidine Bathing in Adult Intensive Care Units Reduce Blood Culture Contamination? A Pragmatic Cluster-Randomized Trial

Edward J. Septimus, MD;^{1,2} Mary K. Hayden, MD;³ Ken Kleinman, ScD;⁴ Taliser R. Avery, MS;⁴ Julia Moody, MS;¹
Robert A. Weinstein, MD;⁵ Jason Hickok, MBA, RN;¹ Julie Lankiewicz, MPH;⁴ Adrijana Gombosov, BS;⁶
Katherine Haffenreffer, BS;⁴ Rebecca E. Kaganov, BA;⁴ John A. Jernigan, MD, MS;⁷
Jonathan B. Perlin, MD, PhD;¹ Richard Platt, MD, MS;⁴ Susan S. Huang, MD, MPH⁶

Blood Culture Contamination Percentage



Logistic regression models demonstrated a significant difference across the arms when comparing the reduction in contamination between baseline and intervention periods in both unadjusted ($P=.02$) and adjusted ($P=.02$) analyses. Arm 3 resulted in the greatest reduction in blood culture contamination rates, with an unadjusted odds ratio (OR) of 0.56 (95% confidence interval [CI], 0.044–0.71) and an adjusted OR of 0.55 (95% CI, 0.43–0.71).

The REDUCE MRSA Trial: Impact of Decolonization on Urinary Tract Infection in ICUs

- Universal decolonization reduced candiduria and bacteriuria
 - 22-27% in men
 - No affect in women
- Anatomic differences likely explained by ability to clean
 - Perineal cleaning and cleaning of catheters is key

Cost Impact

Cost Savings of Universal Decolonization to Prevent Intensive Care Unit Infection: Implications of the REDUCE MRSA Trial

Susan S. Huang, MD, MPH;¹ Edward Septimus, MD;² Taliser R. Avery, MPH;³ Grace M. Lee, MD, MPH;³
Jason Hickok, MBA, RN;⁴ Robert A. Weinstein, MD;⁵ Julia Moody, MS;⁴ Mary K. Hayden, MD;⁶
Jonathan B. Perlin, MD, PhD;⁴ Richard Platt, MD, MS;³ G. Thomas Ray, MBA⁷

Take Away Points: Cost Impact

- Universal Decolonization was the dominant strategy
 - Lowest intervention costs
 - Lowest total ICU costs
- For every 1,000 admissions, Universal Decolonization
 - Saved \$171,000
 - Prevented 9 bloodstream infections
- Lowest cost strategy
 - Across a range of MRSA prevalence
 - Regardless of type of screening (PCR or chromogenic agar)
 - Across a wide range of bloodstream infection costs

The REDUCE MRSA Trial: Impact of Decolonization on Urinary Tract Infection in ICUs

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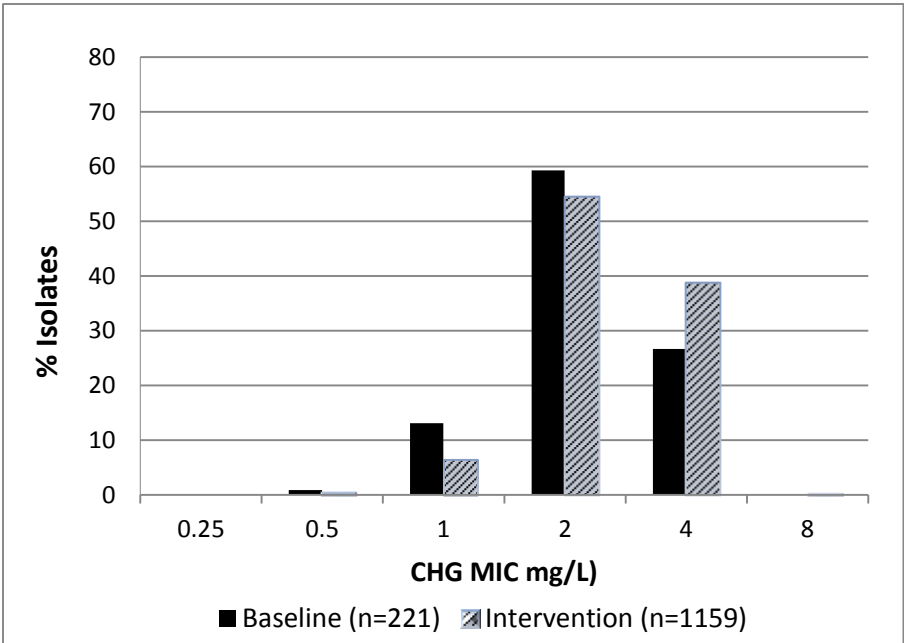
Impact on Resistance

ID Week
October 10, 2014
Oral Abstract # 636

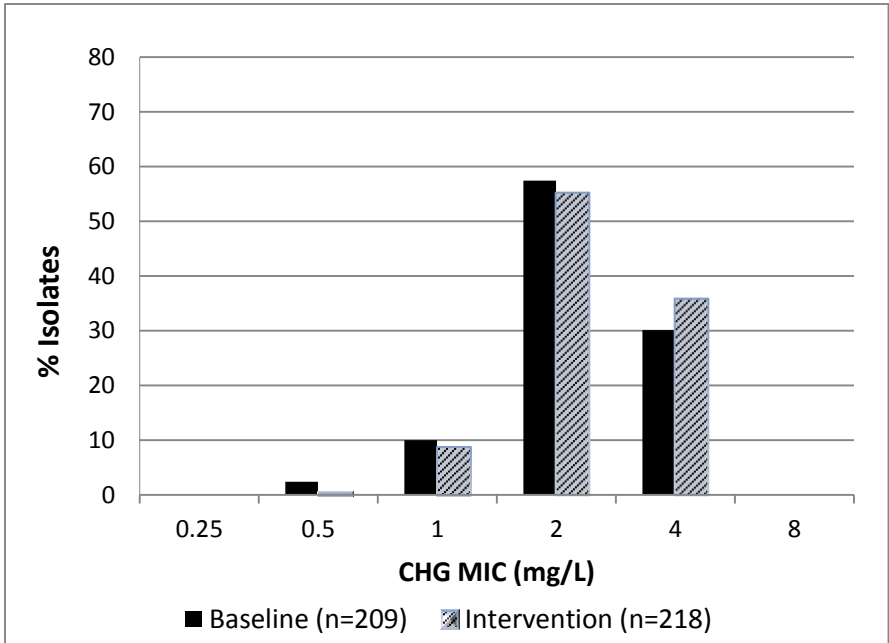
Laboratory Methods

- MRSA isolates identified at local hospital clinical laboratories
- Shipped to central laboratory (Rush, Chicago)
 - Confirmed as MRSA by standard microbiologic methods
- CHG susceptibility
 - Microtiter dilution
 - Non-susceptible: MIC > 4 mg/L
 - *qacA/B* carriage by qPCR*
- Mupirocin susceptibility
 - E-test® (bioMérieux)
 - High-level (HL) resistance: MIC > 256 mg/L
 - Low-level (LL) resistance: MIC 8-64 mg/L

CHG MIC Distributions of all Qualifying MRSA (n=3362)

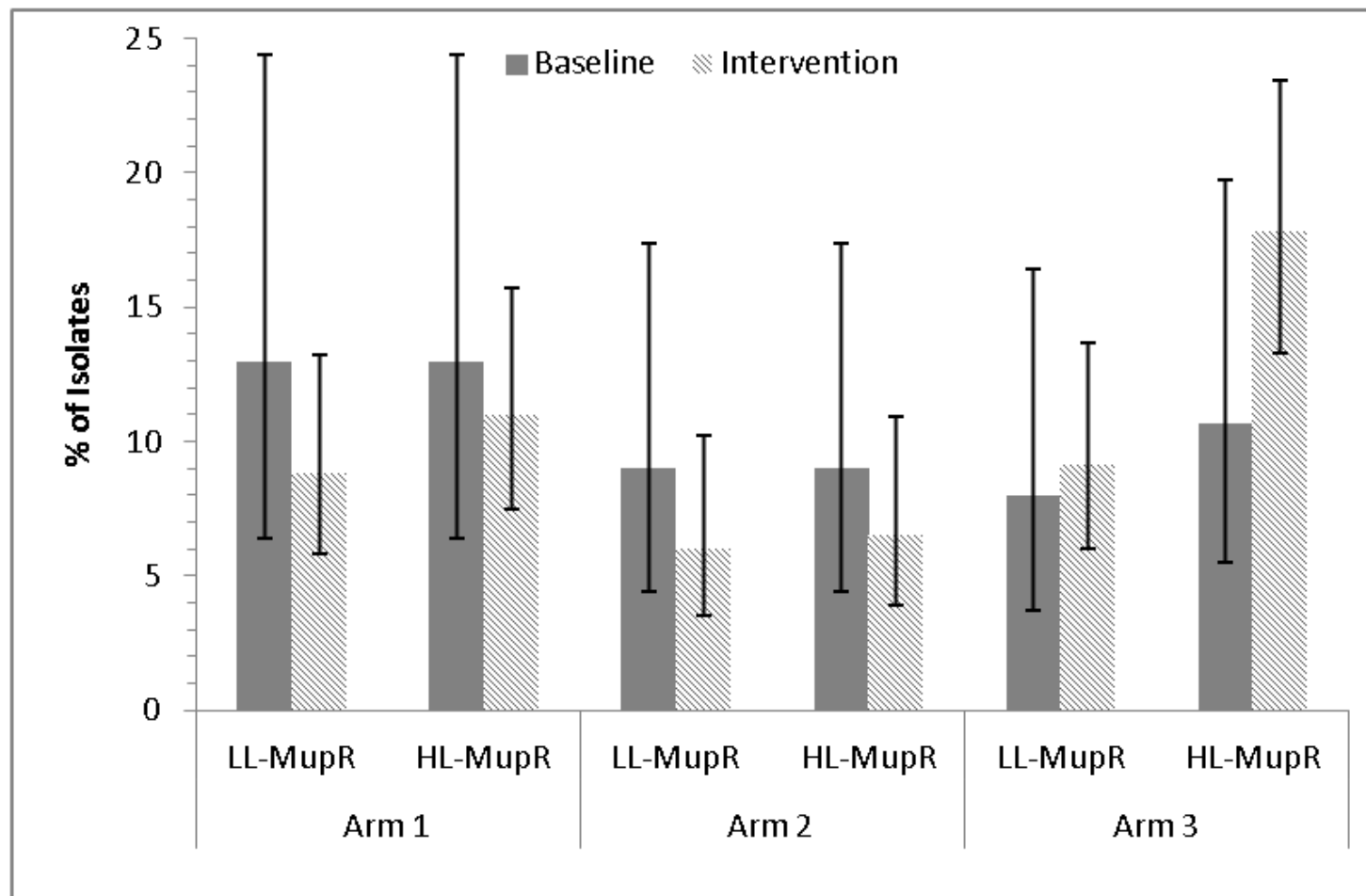


Arm 1
Screening and Contact Precautions



Arm 3
Universal Decolonization

Mupirocin Resistance: All Clinical Isolates (n=853)



- No significant difference in change in % resistant isolates in intervention vs baseline period, across arms, ($p=0.083$)

Noto et al., JAMA Article on CHG Bathing

Original Investigation | CARING FOR THE CRITICALLY ILL PATIENT

Chlorhexidine Bathing and Health Care–Associated Infections A Randomized Clinical Trial

Michael J. Noto, MD, PhD; Henry J. Domenico, MS; Daniel W. Byrne, MS; Tom Talbot, MD, MPH;
Todd W. Rice, MD, MSc; Gordon R. Bernard, MD; Arthur P. Wheeler, MD

IMPORTANCE Daily bathing of critically ill patients with the broad-spectrum, topical antimicrobial agent chlorhexidine is widely performed and may reduce health care–associated infections.

OBJECTIVE To determine if daily bathing of critically ill patients with chlorhexidine decreases the incidence of health care–associated infections.

DESIGN, SETTING, AND PARTICIPANTS 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.

INTERVENTIONS Units performed once-daily bathing of all patients with disposable cloths impregnated with 2% chlorhexidine or nonantimicrobial 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 nonantimicrobial disposable cloths, before crossover to the alternate bathing treatment for 10 weeks. Each unit crossed over between bathing

CONCLUSION AND RELEVANCE In this pragmatic trial, daily bathing with chlorhexidine did not reduce the incidence of health care–associated infections including CLABSIs, CAUTIs, VAP, or *C difficile*. These findings do not support daily bathing of critically ill patients with chlorhexidine.

← Editorial

+ Supplemental content at
jama.com

Comments

- Does not compare to prior large multi-center trials
- Small study: single center, 5 adult ICUs, 2 of units already had implemented CHG bathing
- Short study: 10 week cross over study of CHG vs usual care
- Assurance of training, compliance, application unclear
- Compatibility assessment unknown
- The primary outcome infection rate (a composite outcome of central line-associated bloodstream infections, catheter-associated urinary tract infections, ventilator-associated pneumonia, and *C. difficile* infections)-CHG unlikely to influence VAP or *C. difficile*
- The study was underpowered to detect differences due to the rarity of events, which limits the generalizability of the results

Chlorhexidine daily bathing: Impact on healthcare-associated infections caused by gram-negative bacteria

- From March 2012-May 2013, investigators enrolled 325 patients with at least 1 prior episode of suspected sepsis in the ICU, during two 6-month periods. The intervention group was subjected daily to skin cleansing with 2% CHG impregnated cloths, whereas the control group was bathed daily with soap and water. HAI included bloodstream infections, ventilator-associated pneumonia, and urinary tract infections. Incidence rates corresponded to the number of infections per 1,000 patient days.
- Incidence of HAI was significantly decreased in the intervention group (29 vs 56; $P=.01$).
- The incidence rate of clinical cultures positive for gram-negative bacteria, including Enterobacteriaceae and nonfermenting bacilli, decreased in the intervention group (risk ratio=0.588; 95% CI, 0.346-0.978; $P=.04$)

Rapid Adoption of Universal Decolonization

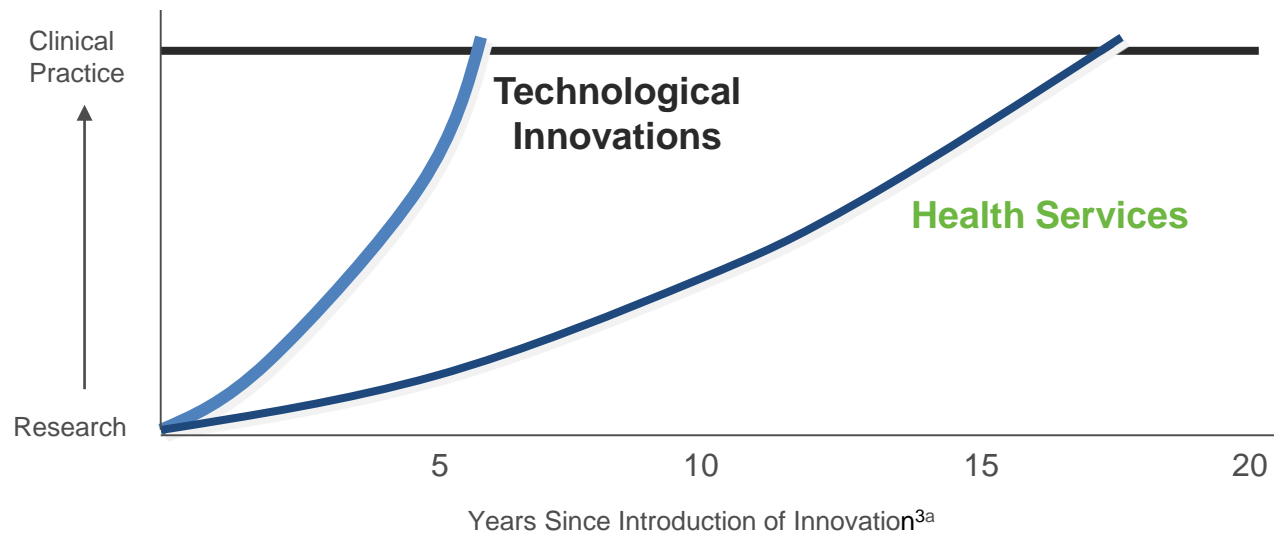
Closing the Translation Gap: Toolkit Based Implementation of Universal Decolonization in Adult Intensive Care Units Reduces Central Line Associated Bloodstream Infections in 95 Community Hospitals

**Septimus E.^{1,2,*}, Hickok J.¹, Moody J.¹, Kleinman K.³, Avery T.R.³, Huang S.S.⁴,
Platt R.³, Perlin J.¹**

Clinical Infectious Diseases Advance Access published May 3, 2016

A Gap Between Evidence and Practice

- One of the most consistent findings from clinical and health services research is the failure to translate research into practice and policy.¹
- Improving population health outcomes relies on implementation of findings from clinical and health services research.²

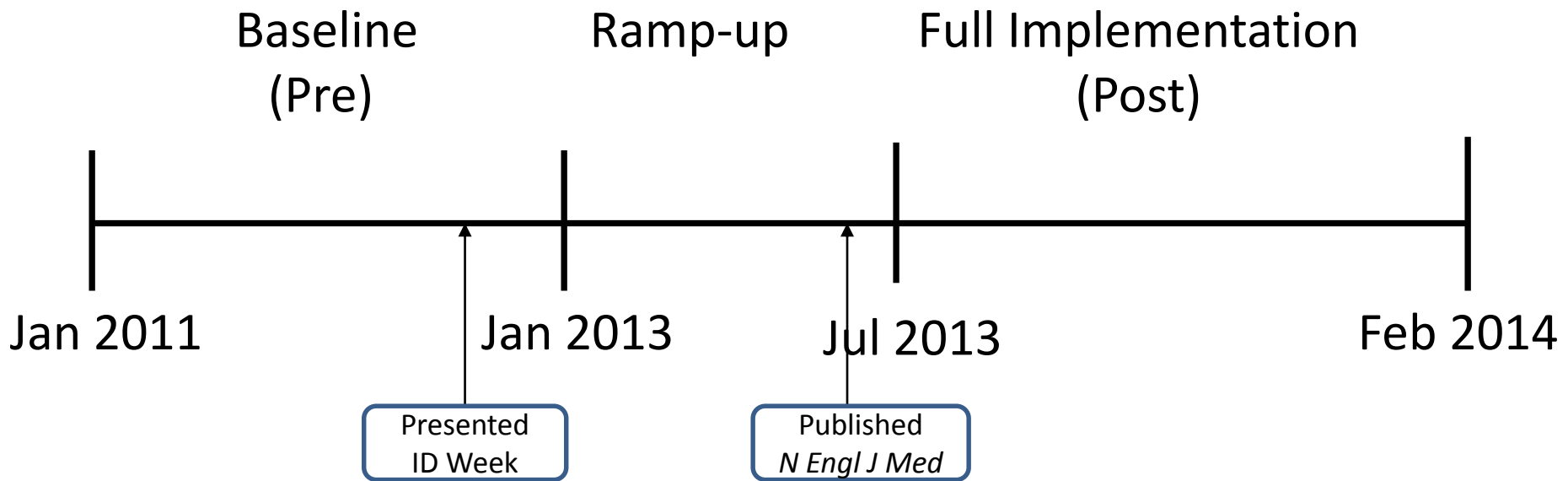


^aFor illustrative purposes only based on data from Balas EA.

It takes an average of 17 years for research to reach clinical practice³

1. Grimshaw et al. *Implementation Science*. 2011;7:50. 2. Evans et al. *Implementation Science*. 2013;8:17. 3. Balas EA, *Yearbook of Medical Informatics* 2000;65-70.

Time Line: Rapid Adoption



137 ICUs from 95 hospitals

AHRQ Website: Toolkit



Agency for Healthcare Research and Quality
Advancing Excellence in Health Care



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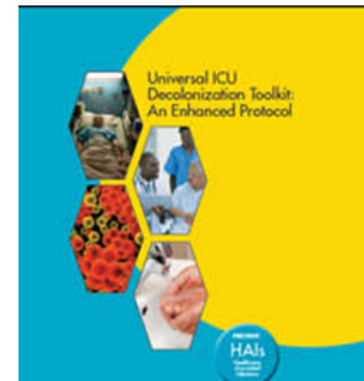
Emergency Severity Index

Universal ICU Decolonization: An Enhanced Protocol

Introduction and Welcome

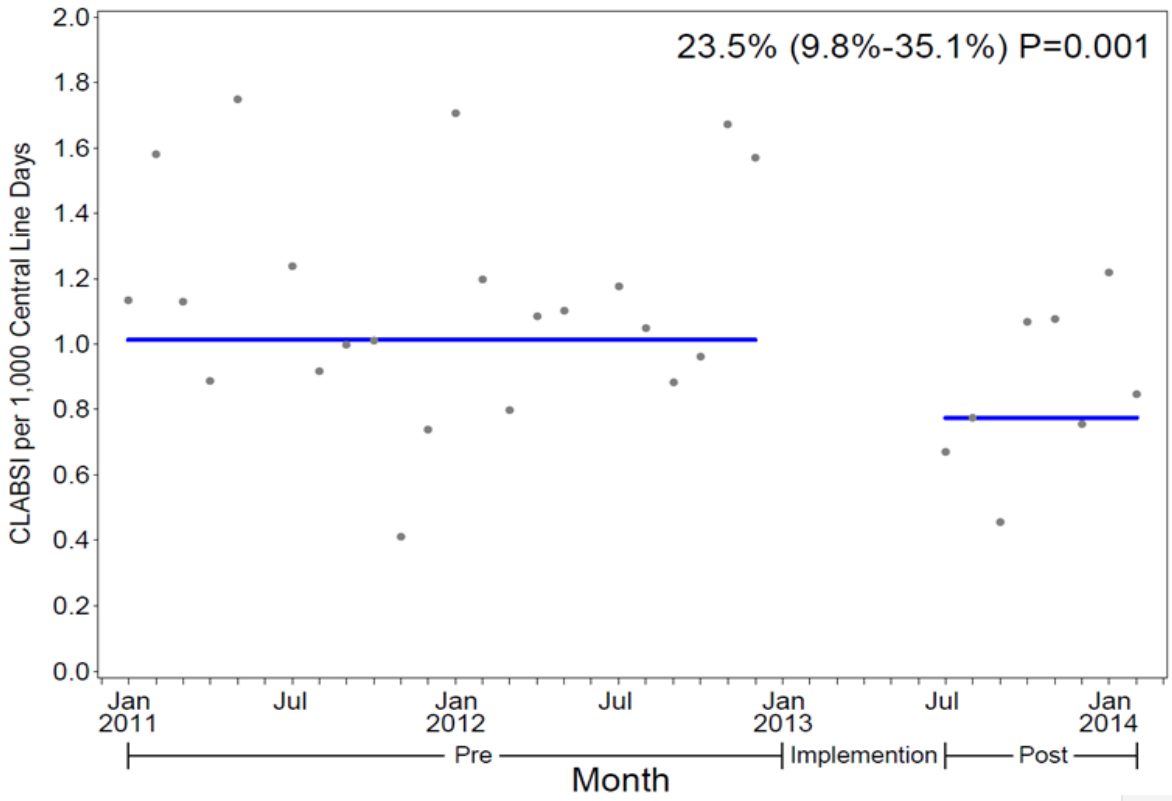
This enhanced protocol is based on materials successfully used in the REDUCE MRSA Trial (**R**andomized **E**valuation of **D**ecolonization vs. **U**niversal **C**learance to **E**liminate Methicillin-Resistant *Staphylococcus aureus*), which found that universal decolonization was the most effective intervention. Universal decolonization led to a 37 percent reduction in MRSA clinical cultures and a 44 percent reduction in all-cause bloodstream infections.

Publication # 13-0052-EF



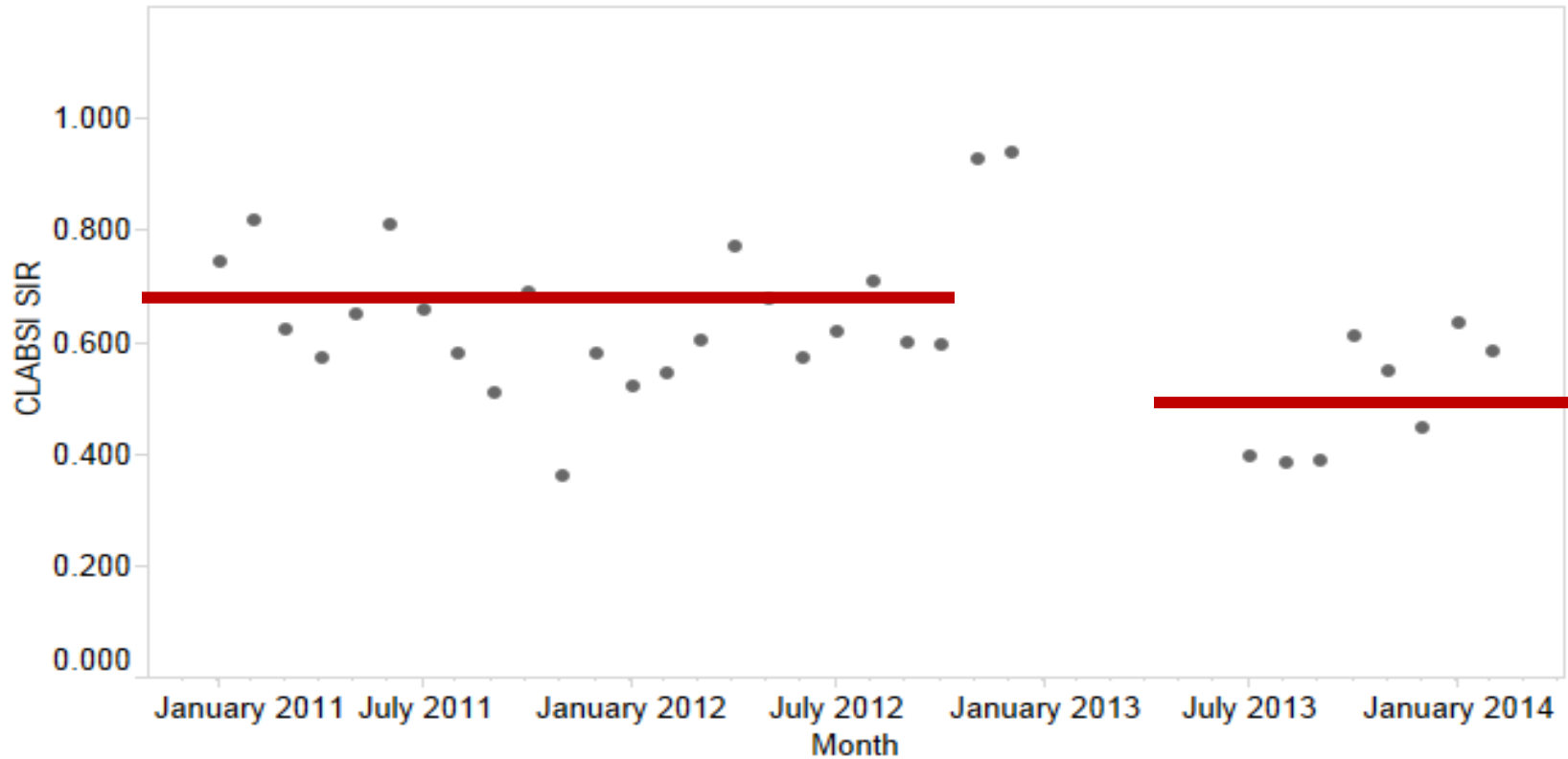
http://www.ahrq.gov/professionals/systems/hospital/universal_icu_decolonization.html

Post-Trial Roll Out HCA



Post-Trial Roll Out HCA

CLABSI Standardized Infection Ratios (SIR) by Month in HCA Adult ICUs



(SIR) decreased 21.5% (p =.004, 95% CI [7.5%, 33.5%])

ABATE Infection Trial

Active Bathing to Eliminate Infection

Adult NonCritical Care Patient Wards



ABATE Infection Trial

Active Bathing to Eliminate Infection

Trial Design

- 53 and 191 units all HCA hospitals, 14 states
- All or most adult non-critical care units participating
- Includes: adult medical, surgical, step down, oncology
- Excludes: pediatrics, rehab, psych, peri-partum, BMT

Arm 1: Routine Care

- Routine policy for showering/bathing

Arm 2: Decolonization

- Daily CHG shower or CHG cloth bathing routine for all patients
- Mupirocin x 5 days for those MRSA+ by history or screen

Outcomes

Outcomes obtained from the HCA data warehouse

Primary Outcomes

- Unit-attributable clinical cultures with MRSA and VRE

Additional Outcomes

- Unit-attributable clinical cultures with GNR MDRO
- Unit-attributable clinical cultures with *C. difficile*
- Bloodstream infections: all pathogens
- Bloodstream contaminants
- Urinary tract infections: all pathogens
- 30 day readmissions (total and infectious)
- Emergence of resistance (strain collection)
- Cost effectiveness

ABATE Lab Strain Collection

- Collecting MRSA & select GNR isolates
 - Acinetobacter, Burkholderia , E. coli, Klebsiella, Proteus, Pseudomonas, Serratia, Stenotrophomonas
- Adult Non-ICU patients
 - Adult medical, cardiac/telemetry, mixed medical/surgical, surgical, orthopedic, step-down, oncology units
- Only one per species per patient per hospital admission
- Collaborate with hospital infection preventionist or epidemiologist to confirm isolates to save for shipment

ABATE Current Status

Study Start:
June 2014

Study Ended:
February 2016



June 2015:
Revaluation of Power

- Will have full baseline data to confirm outcome rates
- Allows us to confirm study end in November or determine if one more quarter is needed

Intervention Data

	Arm 1	Arm 2
# of Hospital Admissions	274,961	321,591
# of Unit Admissions	295,848	349,416
# of Unit Patient Days*	1,359,725	1,657,262
# of Completed Bathing Responses	619,106	984,136

Arm 2 % Bathing	Arm 2 % Showering
65%	17%

*Represents total patient days. Attributed patient days pending.

REDUCE vs ABATE

	REDUCE	ABATE
# of Hospitals	43	53
# of Units	74	191
# of Admissions	74,256	596,552
# Patient Days	~282,000	~3,000,000

Infection Prevention Approaches

- **Vertical:** Substantially reduces a pathogen specific
 - Active surveillance(e.g. MRSA, *C. difficile*, MDRO)
 - Contact precautions(e.g. MRSA colonization or MRSA, *C. difficile* infection, MDRO)
 - Decolonization (e.g. MRSA)
 - Vaccination (e.g. influenza, Tdap)
- **Horizontal:** Substantially reduces all infections and is not pathogen specific
 - Standard precautions (HH, cough etiquette, PPE, ? universal gloving)
 - Environmental cleaning and disinfection
 - Antimicrobial stewardship
 - Bundles of care (e.g. CLABSI, SCIP, Vent)
 - CHG bathing
 - Selective digestive tract decontamination
 - Behavior modification

Modified Int J of Infect Dis. 1 4S4;2010: S3

SHOULD CHG BATHING BE STANDARD OF CARE?

Horizontal > Vertical

Bath ICU patients > 2 months of age with CHG on a daily basis quality of evidence I
The role of chlorhexidine bathing in non-ICU patients remains to be determined¹

Mupirocin-Iodophor ICU Swapout Trial

Background

- Mupirocin (antibiotic) use can cause resistance
- Iodophor (antiseptic) has no resistance after decades of use

2-Arm Randomized Trial

- **Routine care arm:** ICU nasal mupirocin and CHG bathing
- **Swapout arm:** ICU nasal iodophor and CHG bathing

Study Population

- Adult ICUs

Outcomes

- *S. aureus* cultures
- All cause bacteremia
- Emergence of resistance to mupirocin and iodophor

Approaches for Preventing Healthcare-Associated Infections: Go Long or Go Wide?

Edward Septimus, MD;¹ Robert A. Weinstein, MD;² Trish M. Perl, MD, MSc;³
Donald A. Goldmann, MD;^{4,5} Deborah S. Yokoe, MD, MPH⁶

- Recommendations

- Use robust quality improvement methods to ensure reliable performance of basic infection prevention practices known to mitigate transmission of MDROs and the infections they cause
- Ensure adherence to evidence based universally applied HAI prevention strategies including hand hygiene, antimicrobial stewardship, and adequate environmental cleaning
- Applying other evidence-based, horizontal strategies such as universal decolonization in settings where benefits are likely to outweigh risks and costs
- Use active surveillance testing and other vertical approaches selectively when epidemiologically important pathogens are newly emerging and rare to a given institution or region or to control outbreaks of specific pathogens

Ben Zoma says: Who is wise? He who learns from others.

Who is a rich? He who is happy with his portion. .

Who is honored? He who honors others.

REDUCE MRSA and ABATE

University of California Irvine

- Susan Huang
- Adriana Gombosev
- Eric Cui
- Leah Terpstra
- Lauren Heim

Harvard Pilgrim Health Care Institute

- Richard Platt
- Ken Kleinman
- Taliser Avery
- Julie Lankiewicz
- Katie Haffenreffer
- Rebecca Kaganov
- Fallon Onufrak
- Rebecca Kaganov
- Lauren Shimelman

Hospital Corporation of America

- Ed Septimus
- Julia Moody
- Jason Hickok
- Chris Bushe
- Jonathan Perlin
- Jane Englebright

CDC

- John Jernigan

Rush University

- Mary Hayden
- Robert Weinstein
- Karen Lolans

Washington University St. Louis

- Victoria Fraser



THANKS
😊