Controversies in Preventing MRSA and VRE Infections

Andrew E. Simor, MD, FRCPC, FIDSA
Sunnybrook Health Sciences Centre
University of Toronto, Toronto, ON

Disclosures

I have received grants, and served as a consultant on Advisory Boards for:

- Cubist Pharmaceuticals Canada, Inc.
- Merck Pharmaceuticals Canada, Inc.
- Sunovion Pharmaceuticals Canada, Inc.

Imagine this scenario …

On average, 1 MRSA infection occurs in your hospital's ICU each week.

Which strategy
you suggest
to reduce the rate of
MRSA infections in the ICU?

Which strategy would you suggest?

1. Maintain status quo.
2. Active screening for MRSA on admission and weekly while in ICU; contact precautions for carriers.
3. As in #2 above, and decolonize MRSA carriers (with mupirocin).
4. Daily bathing of all ICU patients with CHG.
5. Decolonize all ICU patients with CHG + mupirocin (no screening).

Does MRSA Decolonization in the ICU Result in Lower Infection Rates?

Decolonization

treatment to eradicate staphylococcal carriage

Chlorhexidine and Staphylococcal Carriage

Relationship between Chlorhexidine Gluconate Skin Concentration and Microbial Density on the Skin of Critically Ill Patients Bathed Daily with Chlorhexidine Gluconate

Kyle J. Popovich, MD;[1,2] Rosie Lyles, MD;[2] Robert Hayes, BA;[1] Bala Hota, MD, MPH;[1,2]
William Trick, MD;[2] Robert A. Weinstein, MD;[1,2] Mary K. Hayden, MD[1]

OBJECTIVE AND DESIGN. Previous work has shown that daily skin cleansing with chlorhexidine gluconate (CHG) is effective in preventing infection in the medical intensive care unit (MICU). A colorimetric, semiquantitative indicator was used to measure CHG concentration on skin (neck, antecubital fossae, and inguinal areas) of patients bathed daily with CHG during their MICU stay and after discharge from the MICU, when CHG bathing stopped.

PATIENTS AND SETTING. MICU patients at Rush University Medical Center.

METHODS. CHG concentration on skin was measured and skin sites were cultured quantitatively. The relationship between CHG concentration and microbial density on skin was explored in a mixed-effects model using gram-positive colony-forming unit (CFU) counts.

RESULTS. For 20 MICU patients studied (240 measurements), the lowest CHG concentrations (0–18.75 μg/mL) and the highest gram-positive CFU counts were on the neck (median, 1.07 $\log_{10}$ CFUs; $P = .014$). CHG concentration increased postbath and decreased over 24 hours ($P < .001$). In parallel, median $\log_{10}$ CFUs decreased pre- to postbath (0.78 to 0) and then increased over 24 hours to the baseline of 0.78 ($P = .001$). A CHG concentration above 18.75 μg/mL was associated with decreased gram-positive CFUs ($P = .004$). In all but 2 instances, CHG was detected on patient skin during the entire interbath (approximately 24-hour) period (18 [90%] of 20 patients). In 11 patients studied after MICU discharge (80 measurements), CHG skin concentrations fell below effective levels after 1–3 days.

CONCLUSION. In MICU patients bathed daily with CHG, CHG concentration was inversely associated with microbial density on skin; residual antimicrobial activity on skin persisted up to 24 hours. Determination of CHG concentration on the skin of patients may be useful in monitoring the adequacy of skin cleansing by healthcare workers.

Infect Control Hosp Epidemiol 2012;33(9):889-896

CHG reduces bioburden on skin, and decreases shedding in ICU patients

Popovich, Infect Control Hosp Epidemiol 2012

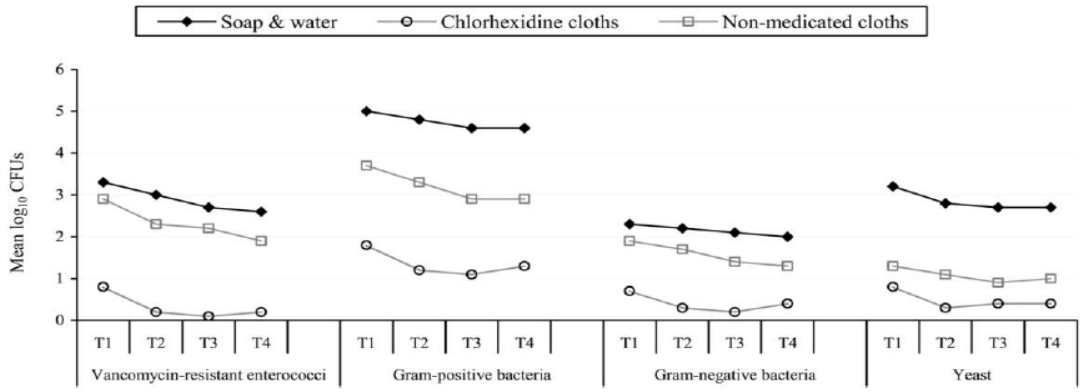
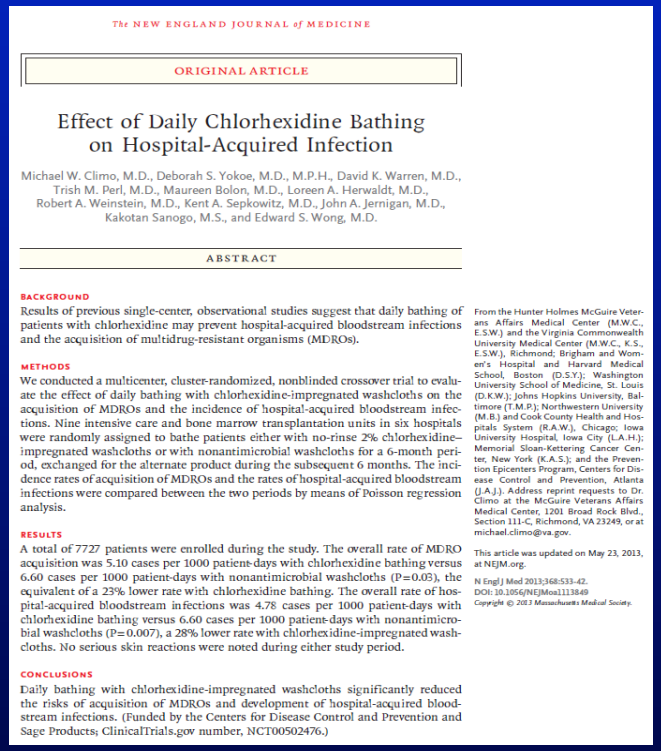


FIGURE 4. Effect of bath procedure on microbial contamination in the inguinal region. Chlorhexidine gluconate (CHG) and nonmedicated baths were performed with no-rinse cloths that contained CHG (and emollients) or only bland cleansing agents (and emollients), respectively.[17] CFU, colony-forming unit; T1, before bath; T2, 0–2 hours after bath; T3, 3–5 hours after bath; T4, 6–8 hours after bath.

Decolonization in the ICU

3 cluster RCTs of CHG or CHG + mupirocin in ICU patients; found decreased MRSA/VRE acquisition, and decreased MRSA infections, including bloodstream infections



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Effect of Daily Chlorhexidine Bathing on Hospital-Acquired Infection

Michael W. Climo, M.D., Deborah S. Yokoe, M.D., M.P.H., David K. Warren, M.D., Trish M. Perl, M.D., Maureen Bolon, M.D., Loreen A. Herwaldt, M.D., Robert A. Weinstein, M.D., Kent A. Sepkowitz, M.D., John A. Jernigan, M.D., Kakotan Sanogo, M.S., and Edward S. Wong, M.D.

ABSTRACT

BACKGROUND

Results of previous single-center, observational studies suggest that daily bathing of patients with chlorhexidine may prevent hospital-acquired bloodstream infections and the acquisition of multidrug-resistant organisms (MDROs).

METHODS

We conducted a multicenter, cluster-randomized, nonblinded crossover trial to evaluate the effect of daily bathing with chlorhexidine-impregnated washcloths on the acquisition of MDROs and the incidence of hospital-acquired bloodstream infections. Nine intensive care and bone marrow transplantation units in six hospitals were randomly assigned to bathe patients either with no-rinse 2% chlorhexidine–impregnated washcloths or with nonantimicrobial washcloths for a 6-month period, exchanged for the alternate product during the subsequent 6 months. The incidence rates of acquisition of MDROs and the rates of hospital-acquired bloodstream infections were compared between the two periods by means of Poisson regression analysis.

RESULTS

A total of 7727 patients were enrolled during the study. The overall rate of MDRO acquisition was 5.10 cases per 1000 patient-days with chlorhexidine bathing versus 6.60 cases per 1000 patient-days with nonantimicrobial washcloths (P=0.03), the equivalent of a 23% lower rate with chlorhexidine bathing. The overall rate of hospital-acquired bloodstream infections was 4.78 cases per 1000 patient-days with chlorhexidine bathing versus 6.60 cases per 1000 patient-days with nonantimicrobial washcloths (P=0.007), a 28% lower rate with chlorhexidine-impregnated washcloths. No serious skin reactions were noted during either study period.

CONCLUSIONS

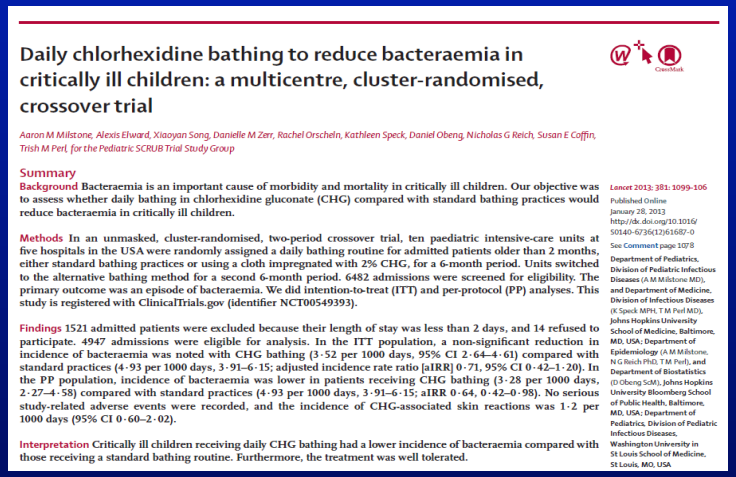
Daily bathing with chlorhexidine-impregnated washcloths significantly reduced the risks of acquisition of MDROs and development of hospital-acquired bloodstream infections. (Funded by the Centers for Disease Control and Prevention and Sage Products; ClinicalTrials.gov number, NCT00502476.)

From the Hunter Holmes McGuire Veterans Affairs Medical Center (M.W.C., E.S.W.) and the Virginia Commonwealth University Medical Center (M.W.C., K.S., E.S.W.), Richmond; Brigham and Women's Hospital and Harvard Medical School, Boston (D.S.Y.); Washington University School of Medicine, St. Louis (D.K.W.); Johns Hopkins University, Baltimore (T.M.P.); Northwestern University (M.B.) and Cook County Health and Hospitals System (R.A.W.), Chicago; Iowa University Hospital, Iowa City (L.A.H.); Memorial Sloan-Kettering Cancer Center, New York (K.A.S.); and the Prevention Epicenters Program, Centers for Disease Control and Prevention, Atlanta (J.A.J.). Address reprint requests to Dr. Climo at the McGuire Veterans Affairs Medical Center, 1201 Broad Rock Blvd., Section 111-C, Richmond, VA 23249, or at michael.climo@va.gov.

This article was updated on May 23, 2013, at NEJM.org.

N Engl J Med 2013;368:533-42.
DOI: 10.1056/NEJMoa1113849

Climo, NEJM 2013



Daily chlorhexidine bathing to reduce bacteraemia in critically ill children: a multicentre, cluster-randomised, crossover trial

Aaron M Milstone, Alexis Elward, Xiaoyan Song, Danielle M Zerr, Rachel Orscheln, Kathleen Speck, Daniel Obeng, Nicholas G Reich, Susan E Coffin, Trish M Perl, for the Pediatric SCRUB Trial Study Group

Summary

Background Bacteraemia is an important cause of morbidity and mortality in critically ill children. Our objective was to assess whether daily bathing in chlorhexidine gluconate (CHG) compared with standard bathing practices would reduce bacteraemia in critically ill children.

Methods In an unmasked, cluster-randomised, two-period crossover trial, ten paediatric intensive-care units at five hospitals in the USA were randomly assigned a daily bathing routine for admitted patients older than 2 months, either standard bathing practices or using a cloth impregnated with 2% CHG, for a 6-month period. Units switched to the alternative bathing method for a second 6-month period. 6482 admissions were screened for eligibility. The primary outcome was an episode of bacteraemia. We did intention-to-treat (ITT) and per-protocol (PP) analyses. This study is registered with ClinicalTrials.gov (identifier NCT00549393).

Findings 1521 admitted patients were excluded because their length of stay was less than 2 days, and 14 refused to participate. 4947 admissions were eligible for analysis. In the ITT population, a non-significant reduction in incidence of bacteraemia was noted with CHG bathing (3·52 per 1000 days, 95% CI 2·64–4·61) compared with standard practices (4·93 per 1000 days, 3·91–6·15; adjusted incidence rate ratio [aIRR] 0·71, 95% CI 0·42–1·20). In the PP population, incidence of bacteraemia was lower in patients receiving CHG bathing (3·28 per 1000 days, 2·27–4·58) compared with standard practices (4·93 per 1000 days, 3·91–6·15; aIRR 0·64, 0·42–0·98). No serious study-related adverse events were recorded, and the incidence of CHG-associated skin reactions was 1·2 per 1000 days (95% CI 0·60–2·02).

Interpretation Critically ill children receiving daily CHG bathing had a lower incidence of bacteraemia compared with those receiving a standard bathing routine. Furthermore, the treatment was well tolerated.

Lancet 2013; 381: 1099-106
Published Online January 28, 2013
http://dx.doi.org/10.1016/S0140-6736(12)61687-0
See Comment page 1078

Department of Pediatrics, Division of Pediatric Infectious Diseases (A M Milstone MD), and Department of Medicine, Division of Infectious Diseases (K Speck MPH, T M Perl MD), Johns Hopkins University School of Medicine, Baltimore, MD, USA; Department of Epidemiology (A M Milstone, N G Reich PhD, T M Perl), and Department of Biostatistics (D Obeng ScM), Johns Hopkins University Bloomberg School of Public Health, Baltimore, MD, USA; Department of Pediatrics, Division of Pediatric Infectious Diseases, Washington University in St Louis School of Medicine, St Louis, MO, USA

Millstone, Lancet 2013

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 Gombosev, 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*

ABSTRACT

BACKGROUND

Both targeted decolonization and universal decolonization of patients in intensive care units (ICUs) are candidate strategies to prevent health care–associated infections, particularly those caused by methicillin-resistant *Staphylococcus aureus* (MRSA).

METHODS

We conducted a pragmatic, cluster-randomized trial. Hospitals were randomly assigned to one of three strategies, with all adult ICUs in a given hospital assigned to the same strategy. Group 1 implemented MRSA screening and isolation; group 2, targeted decolonization (i.e., screening, isolation, and decolonization of MRSA carriers); and group 3, universal decolonization (i.e., no screening, and decolonization of all patients). Proportional-hazards models were used to assess differences in infection reductions across the study groups, with clustering according to hospital.

RESULTS

A total of 43 hospitals (including 74 ICUs and 74,256 patients during the intervention period) underwent randomization. In the intervention period versus the baseline period, modeled hazard ratios for MRSA clinical isolates were 0.92 for screening and isolation (crude rate, 3.2 vs. 3.4 isolates per 1000 days), 0.75 for targeted decolonization (3.2 vs. 4.3 isolates per 1000 days), and 0.63 for universal decolonization (2.1 vs. 3.4 isolates per 1000 days) (P=0.01 for test of all groups being equal). In the intervention versus baseline periods, hazard ratios for bloodstream infection with any pathogen in the three groups were 0.99 (crude rate, 4.1 vs. 4.2 infections per 1000 days), 0.78 (3.7 vs. 4.8 infections per 1000 days), and 0.56 (3.6 vs. 6.1 infections per 1000 days), respectively (P<0.001 for test of all groups being equal). Universal decolonization resulted in a significantly greater reduction in the rate of all bloodstream infections than either targeted decolonization or screening and isolation. One bloodstream infection was prevented per 54 patients who underwent decolonization. The reductions in rates of MRSA bloodstream infection were similar to those of all bloodstream infections, but the difference was not significant. Adverse events, which occurred in 7 patients, were mild and related to chlorhexidine.

CONCLUSIONS

In routine ICU practice, universal decolonization was more effective than targeted decolonization or screening and isolation in reducing rates of MRSA clinical isolates and bloodstream infection from any pathogen. (Funded by the Agency for Healthcare Research and the Centers for Disease Control and Prevention; REDUCE MRSA ClinicalTrials.gov number, NCT00980980.)

From the University of California Irvine School of Medicine, Orange (S.S.H., A.G., L.T., E.C.); Hospital Corporation of America, Houston (E.S.) and Nashville (J.M., J.H., J.B.P.); Texas A&M Health Science Center, Houston (E.S.); Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston (K.K., T.R.A., J.L., F.H., K.H., R.E.K., R.P.); Rush Medical College (M.K.H., K.L.) and John Stroger Hospital of Cook County (R.A.W.), Chicago; Centers for Disease Control and Prevention, Atlanta (J.A.J.); and Washington University in St. Louis, St. Louis (V.J.F.). Address reprint requests to Dr. Huang at the Division of Infectious Diseases and Health Policy Research Institute, University of California Irvine School of Medicine, 101 City Dr., City Tower Suite 400, ZC-4081, Orange, CA 92868, or at sshuang@uci.edu.

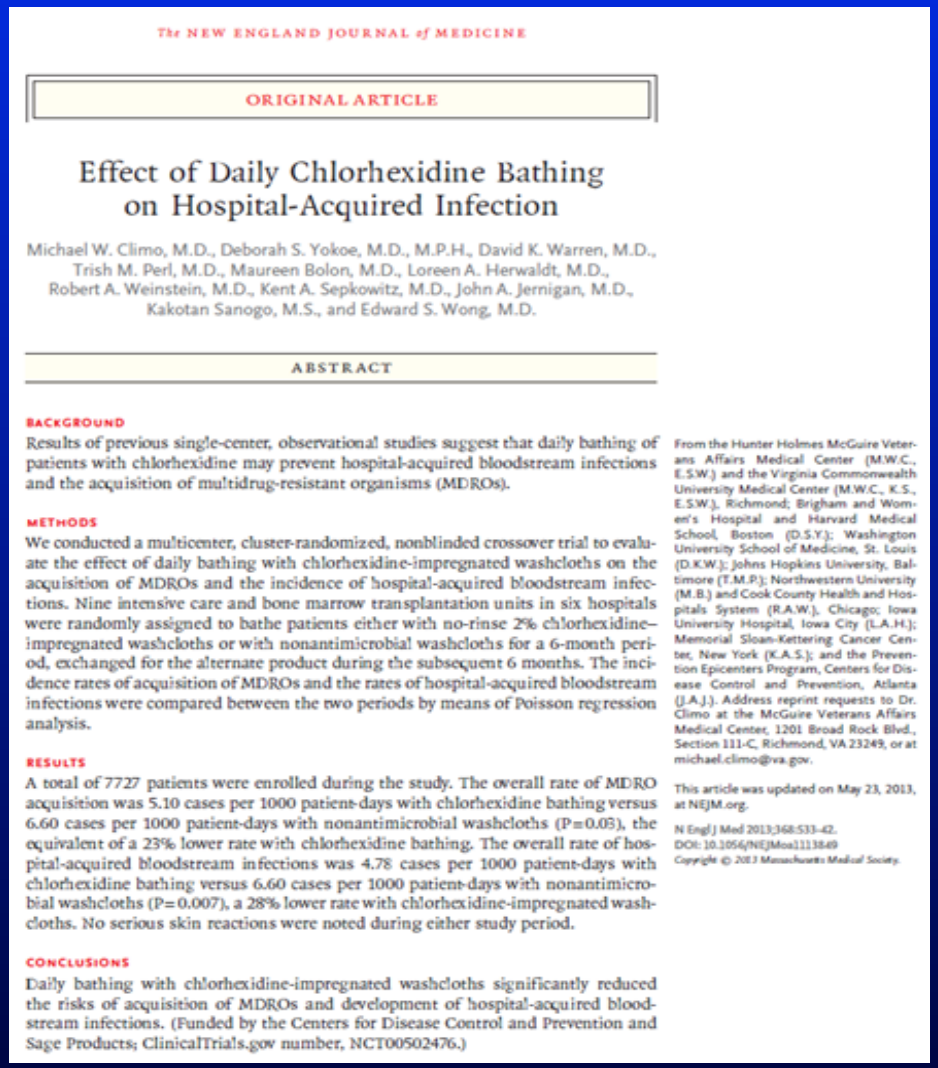
*Investigators for the Centers for Disease Control and Prevention (CDC) Prevention Epicenters Program and the Agency for Healthcare Research and Quality (AHRQ) Developing Evidence to Inform Decisions about Effectiveness (DECIDE) Network and Healthcare-Associated Infections Program are listed in the Supplementary Appendix, available at NEJM.org.

This article was published on May 29, 2013, and updated on June 13, 2013, at NEJM.org.

N Engl J Med 2013;368:2255-65.
DOI: 10.1056/NEJMoa1209390

Huang, NEJM 2013

Chlorhexidine Bathing in the ICU



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Effect of Daily Chlorhexidine Bathing on Hospital-Acquired Infection

Michael W. Climo, M.D., Deborah S. Yokoe, M.D., M.P.H., David K. Warren, M.D., Trish M. Perl, M.D., Maureen Bolon, M.D., Loreen A. Herwaldt, M.D., Robert A. Weinstein, M.D., Kent A. Sepkowitz, M.D., John A. Jernigan, M.D., Kakotan Sanogo, M.S., and Edward S. Wong, M.D.

ABSTRACT

BACKGROUND

Results of previous single-center, observational studies suggest that daily bathing of patients with chlorhexidine may prevent hospital-acquired bloodstream infections and the acquisition of multidrug-resistant organisms (MDROs).

METHODS

We conducted a multicenter, cluster-randomized, nonblinded crossover trial to evaluate the effect of daily bathing with chlorhexidine-impregnated washcloths on the acquisition of MDROs and the incidence of hospital-acquired bloodstream infections. Nine intensive care and bone marrow transplantation units in six hospitals were randomly assigned to bathe patients either with no-rinse 2% chlorhexidine–impregnated washcloths or with nonantimicrobial washcloths for a 6-month period, exchanged for the alternate product during the subsequent 6 months. The incidence rates of acquisition of MDROs and the rates of hospital-acquired bloodstream infections were compared between the two periods by means of Poisson regression analysis.

RESULTS

A total of 7727 patients were enrolled during the study. The overall rate of MDRO acquisition was 5.10 cases per 1000 patient-days with chlorhexidine bathing versus 6.60 cases per 1000 patient-days with nonantimicrobial washcloths (P=0.03), the equivalent of a 23% lower rate with chlorhexidine bathing. The overall rate of hospital-acquired bloodstream infections was 4.78 cases per 1000 patient-days with chlorhexidine bathing versus 6.60 cases per 1000 patient-days with nonantimicrobial washcloths (P=0.007), a 28% lower rate with chlorhexidine-impregnated washcloths. No serious skin reactions were noted during either study period.

CONCLUSIONS

Daily bathing with chlorhexidine-impregnated washcloths significantly reduced the risks of acquisition of MDROs and development of hospital-acquired bloodstream infections. (Funded by the Centers for Disease Control and Prevention and Sage Products; ClinicalTrials.gov number, NCT00502476.)

From the Hunter Holmes McGuire Veterans Affairs Medical Center (M.W.C., E.S.W.) and the Virginia Commonwealth University Medical Center (M.W.C., K.S., E.S.W.), Richmond; Brigham and Women's Hospital and Harvard Medical School, Boston (D.S.Y.); Washington University School of Medicine, St. Louis (D.K.W.); Johns Hopkins University, Baltimore (T.M.P.); Northwestern University (M.B.) and Cook County Health and Hospitals System (R.A.W.), Chicago; Iowa University Hospital, Iowa City (L.A.H.); Memorial Sloan-Kettering Cancer Center, New York (K.A.S.); and the Prevention Epicenters Program, Centers for Disease Control and Prevention, Atlanta (J.A.J.). Address reprint requests to Dr. Climo at the McGuire Veterans Affairs Medical Center, 1201 Broad Rock Blvd., Section 111-C, Richmond, VA 23249, or at michael.climo@va.gov.

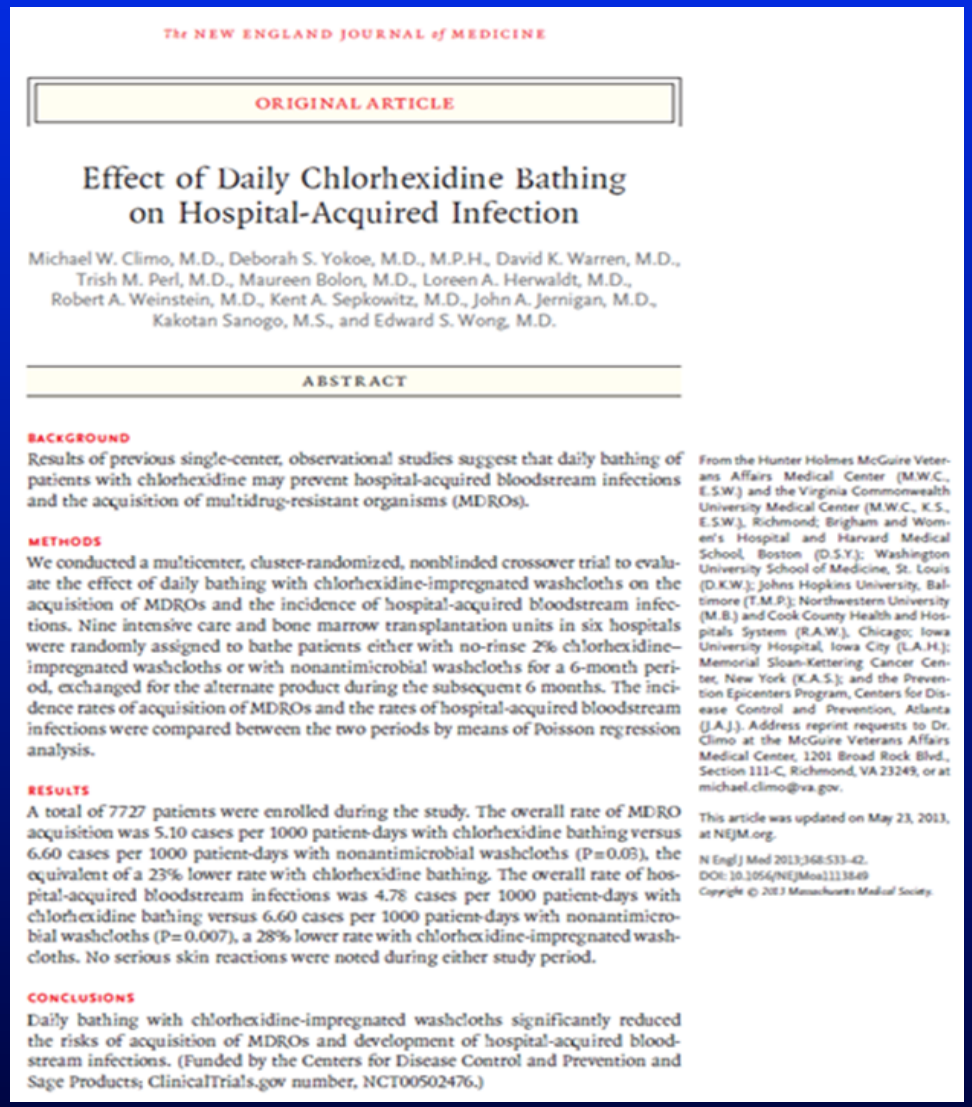
This article was updated on May 23, 2013, at NEJM.org.

N Engl J Med 2013;368:533-42.
DOI: 10.1056/NEJMoa1113849

A cluster-randomized crossover trial in ICUs to evaluate daily bathing with CHG on acquisition of MRSA/ VRE, and incidence of HA-BSI

Climo, N Engl J Med 2013

Chlorhexidine Bathing in the ICU



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Effect of Daily Chlorhexidine Bathing on Hospital-Acquired Infection

Michael W. Climo, M.D., Deborah S. Yokoe, M.D., M.P.H., David K. Warren, M.D., Trish M. Perl, M.D., Maureen Bolon, M.D., Loreen A. Herwaldt, M.D., Robert A. Weinstein, M.D., Kent A. Sepkowitz, M.D., John A. Jernigan, M.D., Kakotan Sanogo, M.S., and Edward S. Wong, M.D.

ABSTRACT

BACKGROUND

Results of previous single-center, observational studies suggest that daily bathing of patients with chlorhexidine may prevent hospital-acquired bloodstream infections and the acquisition of multidrug-resistant organisms (MDROs).

METHODS

We conducted a multicenter, cluster-randomized, nonblinded crossover trial to evaluate the effect of daily bathing with chlorhexidine-impregnated washcloths on the acquisition of MDROs and the incidence of hospital-acquired bloodstream infections. Nine intensive care and bone marrow transplantation units in six hospitals were randomly assigned to bathe patients either with no-rinse 2% chlorhexidine–impregnated washcloths or with nonantimicrobial washcloths for a 6-month period, exchanged for the alternate product during the subsequent 6 months. The incidence rates of acquisition of MDROs and the rates of hospital-acquired bloodstream infections were compared between the two periods by means of Poisson regression analysis.

RESULTS

A total of 7727 patients were enrolled during the study. The overall rate of MDRO acquisition was 5.10 cases per 1000 patient-days with chlorhexidine bathing versus 6.60 cases per 1000 patient-days with nonantimicrobial washcloths (P=0.03), the equivalent of a 23% lower rate with chlorhexidine bathing. The overall rate of hospital-acquired bloodstream infections was 4.78 cases per 1000 patient-days with chlorhexidine bathing versus 6.60 cases per 1000 patient-days with nonantimicrobial washcloths (P=0.007), a 28% lower rate with chlorhexidine-impregnated washcloths. No serious skin reactions were noted during either study period.

CONCLUSIONS

Daily bathing with chlorhexidine-impregnated washcloths significantly reduced the risks of acquisition of MDROs and development of hospital-acquired bloodstream infections. (Funded by the Centers for Disease Control and Prevention and Sage Products; ClinicalTrials.gov number, NCT00502476.)

From the Hunter Holmes McGuire Veterans Affairs Medical Center (M.W.C., E.S.W.) and the Virginia Commonwealth University Medical Center (M.W.C., K.S., E.S.W.), Richmond; Brigham and Women's Hospital and Harvard Medical School, Boston (D.S.Y.); Washington University School of Medicine, St. Louis (D.K.W.); Johns Hopkins University, Baltimore (T.M.P.); Northwestern University (M.B.) and Cook County Health and Hospitals System (R.A.W.), Chicago; Iowa University Hospital, Iowa City (L.A.H.); Memorial Sloan-Kettering Cancer Center, New York (K.A.S.); and the Prevention Epicenters Program, Centers for Disease Control and Prevention, Atlanta (J.A.J.). Address reprint requests to Dr. Climo at the McGuire Veterans Affairs Medical Center, 1201 Broad Rock Blvd., Section 111-C, Richmond, VA 23249, or at michael.climo@va.gov.

This article was updated on May 23, 2013, at NEJM.org.

N Engl J Med 2013;368:533-42.
DOI: 10.1056/NEJMoa1113849

Results:

23% ↓ MRSA/VRE acquisition (5.1/1000 pt-days vs 6.6/1000 pt-days; *p*=0.05)

28% ↓ nosocomial BSIs (4.8/1000 pt-days vs 6.6/1000 pt-days; *p*=0.007)

Climo, N Engl J Med 2013

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 Gombosev, 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*

ABSTRACT

BACKGROUND

Both targeted decolonization and universal decolonization of patients in intensive care units (ICUs) are candidate strategies to prevent health care–associated infections, particularly those caused by methicillin-resistant *Staphylococcus aureus* (MRSA).

METHODS

We conducted a pragmatic, cluster-randomized trial. Hospitals were randomly assigned to one of three strategies, with all adult ICUs in a given hospital assigned to the same strategy. Group 1 implemented MRSA screening and isolation; group 2, targeted decolonization (i.e., screening, isolation, and decolonization of MRSA carriers); and group 3, universal decolonization (i.e., no screening, and decolonization of all patients). Proportional-hazards models were used to assess differences in infection reductions across the study groups, with clustering according to hospital.

RESULTS

A total of 43 hospitals (including 74 ICUs and 74,256 patients during the intervention period) underwent randomization. In the intervention period versus the baseline period, modeled hazard ratios for MRSA clinical isolates were 0.92 for screening and isolation (crude rate, 3.2 vs. 3.4 isolates per 1000 days), 0.75 for targeted decolonization (3.2 vs. 4.3 isolates per 1000 days), and 0.63 for universal decolonization (2.1 vs. 3.4 isolates per 1000 days) ($P=0.01$ for test of all groups being equal). In the intervention versus baseline periods, hazard ratios for bloodstream infection with any pathogen in the three groups were 0.99 (crude rate, 4.1 vs. 4.2 infections per 1000 days), 0.78 (3.7 vs. 4.8 infections per 1000 days), and 0.56 (3.6 vs. 6.1 infections per 1000 days), respectively ($P<0.001$ for test of all groups being equal). Universal decolonization resulted in a significantly greater reduction in the rate of all bloodstream infections than either targeted decolonization or screening and isolation. One bloodstream infection was prevented per 54 patients who underwent decolonization. The reductions in rates of MRSA bloodstream infection were similar to those of all bloodstream infections, but the difference was not significant. Adverse events, which occurred in 7 patients, were mild and related to chlorhexidine.

CONCLUSIONS

In routine ICU practice, universal decolonization was more effective than targeted decolonization or screening and isolation in reducing rates of MRSA clinical isolates and bloodstream infection from any pathogen. (Funded by the Agency for Healthcare Research and the Centers for Disease Control and Prevention; REDUCE MRSA ClinicalTrials.gov number, NCT00980980.)

From the University of California Irvine School of Medicine, Orange (S.S.H., A.G., L.T., E.C.); Hospital Corporation of America, Houston (E.S.) and Nashville (J.M., J.H., J.B.P.); Texas A&M Health Science Center, Houston (E.S.); Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston (K.K., T.R.A., J.L., F.H., K.H., R.E.K., R.P.); Rush Medical College (M.K.H., K.L.) and John Stroger Hospital of Cook County (R.A.W.), Chicago; Centers for Disease Control and Prevention, Atlanta (J.A.J.); and Washington University in St. Louis, St. Louis (V.J.F.). Address reprint requests to Dr. Huang at the Division of Infectious Diseases and Health Policy Research Institute, University of California Irvine School of Medicine, 101 City Dr., City Tower Suite 400, ZC4081, Orange, CA 92868, or at sshuang@uci.edu.

*Investigators for the Centers for Disease Control and Prevention (CDC) Prevention Epicenters Program and the Agency for Healthcare Research and Quality (AHRQ) Developing Evidence to Inform Decisions about Effectiveness (DECIDE) Network and Healthcare-Associated Infections Program are listed in the Supplementary Appendix, available at NEJM.org.

This article was published on May 29, 2013, and updated on June 13, 2013, at NEJM.org.

N Engl J Med 2013;368:2255-65.
DOI: 10.1056/NEJMoa1207290

Targeted vs Universal Decolonization in ICUs

Huang, N Engl J Med 2013

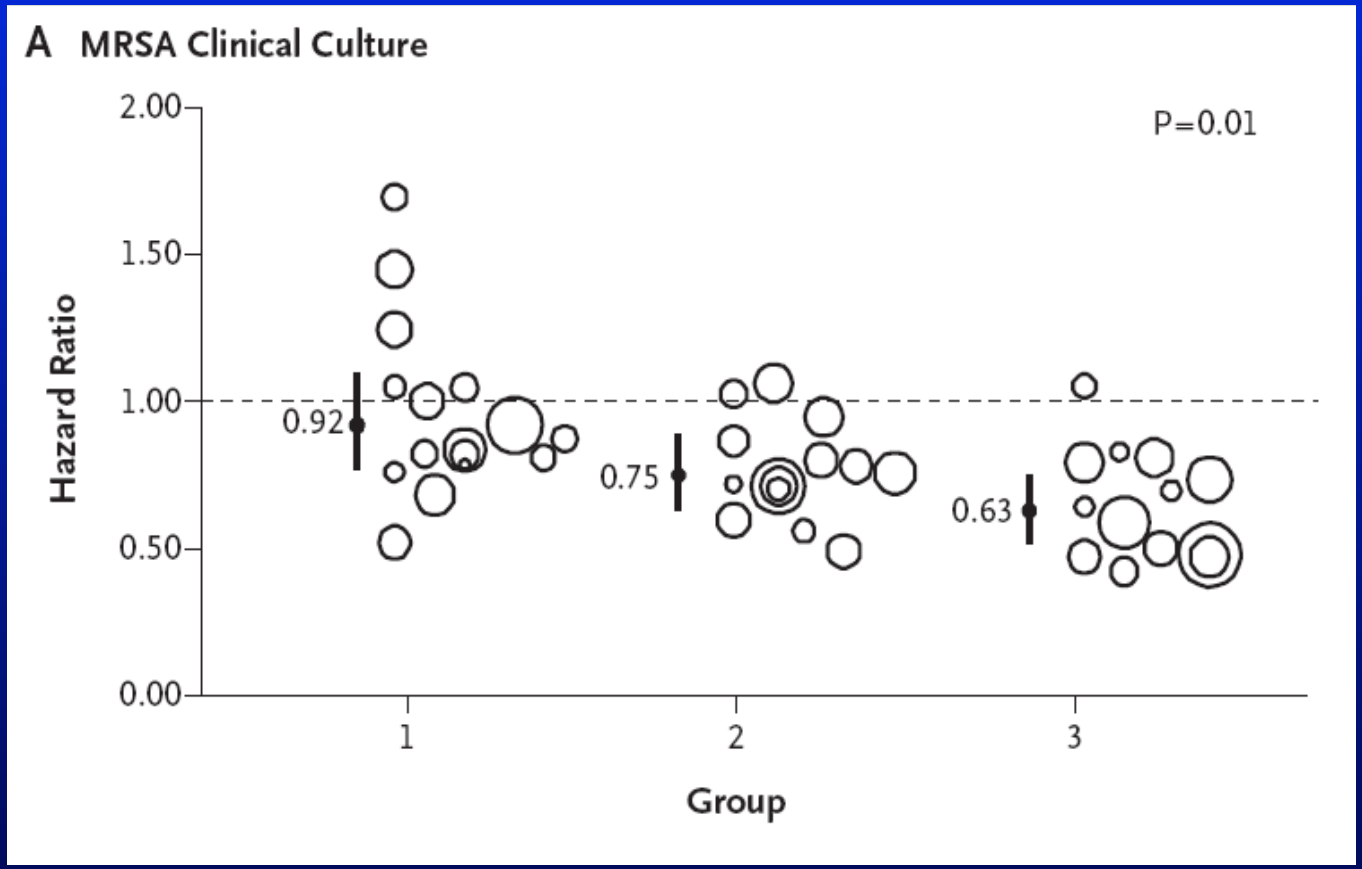
Methods

3-group cluster-randomized trial in ICUs

- admission screening + isolation; no decolonization
- admission screening + isolation; targeted decolonization: MUP + CHG 5 days (if MRSA+ or history of MRSA)
- universal decolonization: MUP 5 days + CHG while in ICU; no MRSA screening

Huang, N Engl J Med 2013

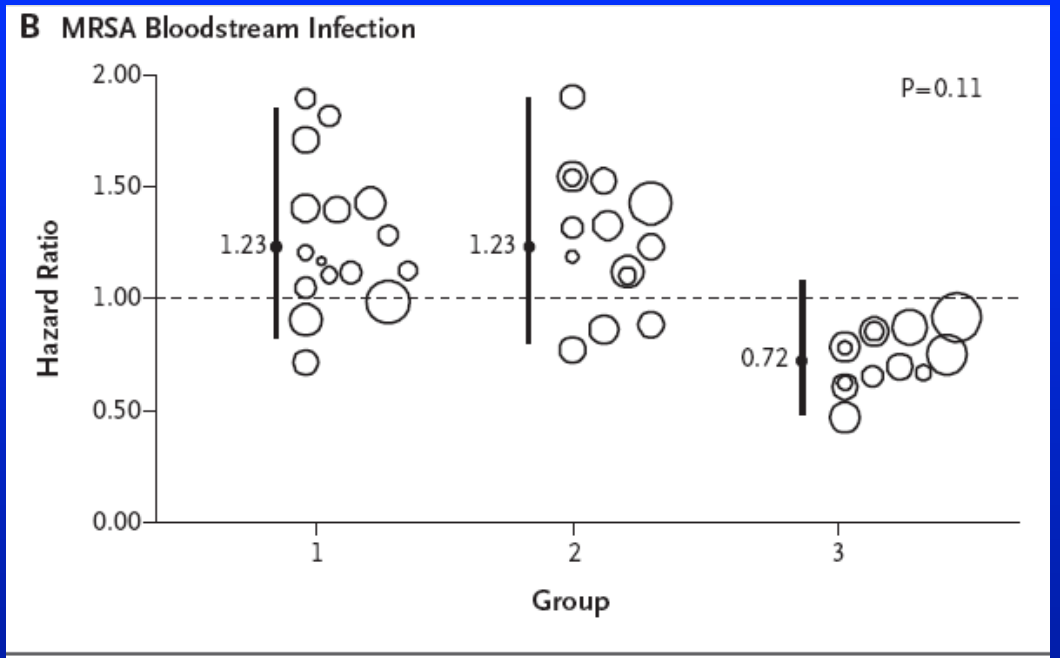
Effect of Interventions on MRSA Clinical Cultures

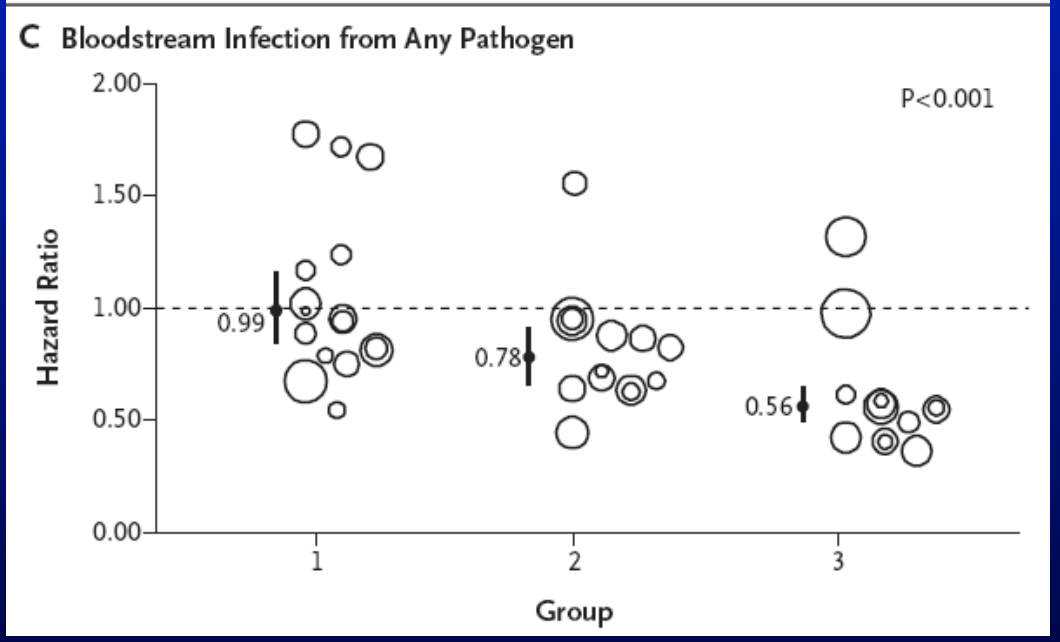


Groups 2 & 3 both better than Group 1

No difference between Groups 2 & 3

Huang, N Engl J Med 2013





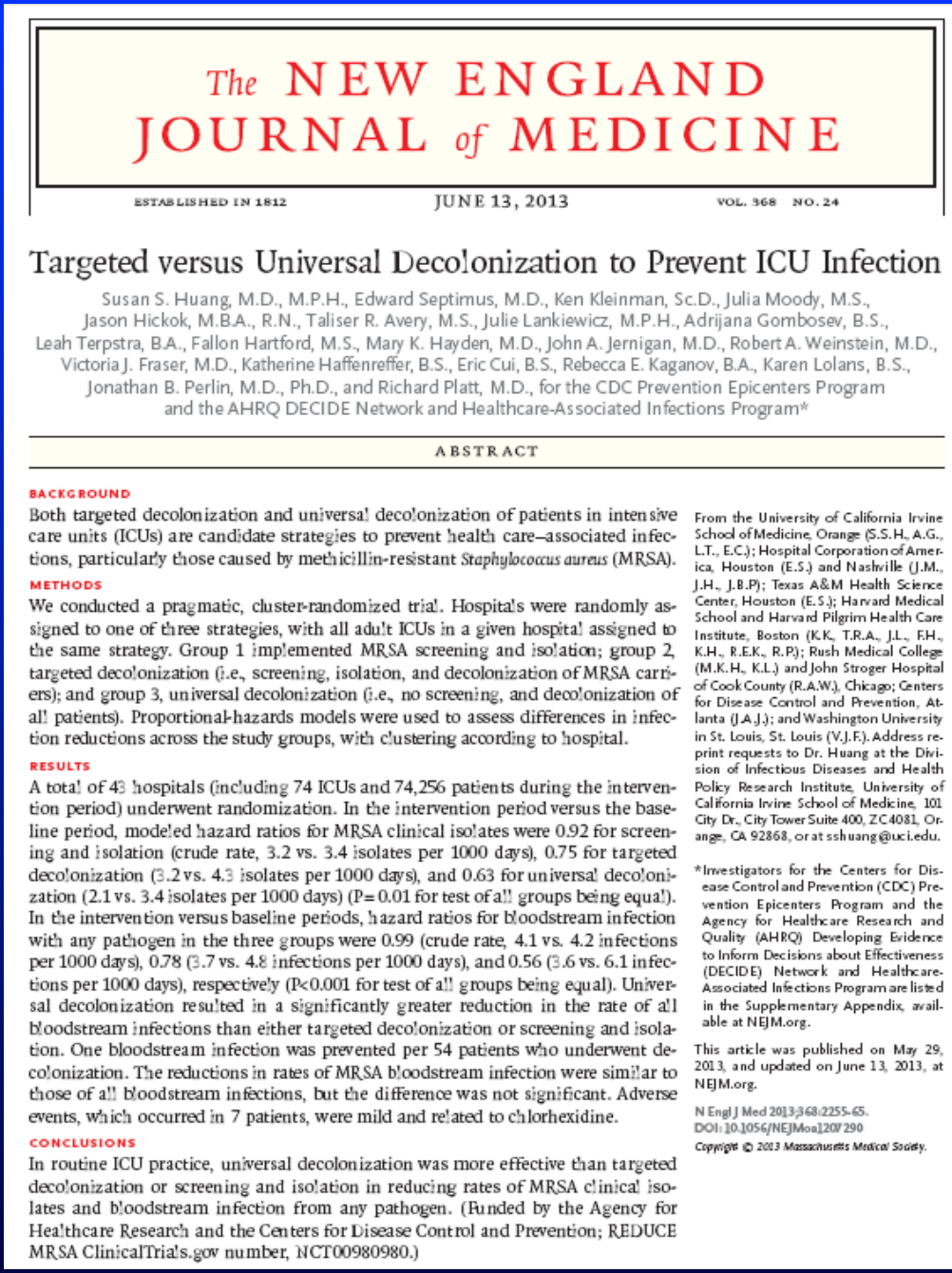
MRSA BSI:

trend for lower rates in Group 3, but not statistically significant

Any BSI:

Groups 2 & 3 better than 1; Group 3 better than Group 2

Huang, N Engl J Med 2013



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 Gombosev, 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*

ABSTRACT

BACKGROUND

Both targeted decolonization and universal decolonization of patients in intensive care units (ICUs) are candidate strategies to prevent health care–associated infections, particularly those caused by methicillin-resistant *Staphylococcus aureus* (MRSA).

METHODS

We conducted a pragmatic, cluster-randomized trial. Hospitals were randomly assigned to one of three strategies, with all adult ICUs in a given hospital assigned to the same strategy. Group 1 implemented MRSA screening and isolation; group 2, targeted decolonization (i.e., screening, isolation, and decolonization of MRSA carriers); and group 3, universal decolonization (i.e., no screening, and decolonization of all patients). Proportional-hazards models were used to assess differences in infection reductions across the study groups, with clustering according to hospital.

RESULTS

A total of 43 hospitals (including 74 ICUs and 74,256 patients during the intervention period) underwent randomization. In the intervention period versus the baseline period, modeled hazard ratios for MRSA clinical isolates were 0.92 for screening and isolation (crude rate, 3.2 vs. 3.4 isolates per 1000 days), 0.75 for targeted decolonization (3.2 vs. 4.3 isolates per 1000 days), and 0.63 for universal decolonization (2.1 vs. 3.4 isolates per 1000 days) ($P=0.01$ for test of all groups being equal). In the intervention versus baseline periods, hazard ratios for bloodstream infection with any pathogen in the three groups were 0.99 (crude rate, 4.1 vs. 4.2 infections per 1000 days), 0.78 (3.7 vs. 4.8 infections per 1000 days), and 0.56 (3.6 vs. 6.1 infections per 1000 days), respectively ($P<0.001$ for test of all groups being equal). Universal decolonization resulted in a significantly greater reduction in the rate of all bloodstream infections than either targeted decolonization or screening and isolation. One bloodstream infection was prevented per 54 patients who underwent decolonization. The reductions in rates of MRSA bloodstream infection were similar to those of all bloodstream infections, but the difference was not significant. Adverse events, which occurred in 7 patients, were mild and related to chlorhexidine.

CONCLUSIONS

In routine ICU practice, universal decolonization was more effective than targeted decolonization or screening and isolation in reducing rates of MRSA clinical isolates and bloodstream infection from any pathogen. (Funded by the Agency for Healthcare Research and the Centers for Disease Control and Prevention; REDUCE MRSA ClinicalTrials.gov number, NCT00980980.)

From the University of California Irvine School of Medicine, Orange (S.S.H., A.G., L.T., E.C.); Hospital Corporation of America, Houston (E.S.) and Nashville (J.M., J.H., J.B.P.); Texas A&M Health Science Center, Houston (E.S.); Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston (K.K., T.R.A., J.L., F.H., K.H., R.E.K., R.P.); Rush Medical College (M.K.H., K.L.) and John Stroger Hospital of Cook County (R.A.W.), Chicago; Centers for Disease Control and Prevention, Atlanta (J.A.J.); and Washington University in St. Louis, St. Louis (V.J.F.). Address reprint requests to Dr. Huang at the Division of Infectious Diseases and Health Policy Research Institute, University of California Irvine School of Medicine, 101 City Dr., City Tower Suite 400, ZC4081, Orange, CA 92868, or at sshuang@uci.edu.

*Investigators for the Centers for Disease Control and Prevention (CDC) Prevention Epicenters Program and the Agency for Healthcare Research and Quality (AHRQ) Developing Evidence to Inform Decisions about Effectiveness (DECIDE) Network and Healthcare-Associated Infections Program are listed in the Supplementary Appendix, available at NEJM.org.

This article was published on May 29, 2013, and updated on June 13, 2013, at NEJM.org.

N Engl J Med 2013;368:2255-65.
DOI: 10.1056/NEJMoa1207290

- **Universal decolonization reduced MRSA clinical cultures by 37%, and all BSIs by 44%**
- **181 patients would have to be decolonized to prevent 1 MRSA culture**

Huang, N Engl J Med 2013

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 Gombosev, 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*

ABSTRACT

BACKGROUND

Both targeted decolonization and universal decolonization of patients in intensive care units (ICUs) are candidate strategies to prevent health care–associated infections, particularly those caused by methicillin-resistant *Staphylococcus aureus* (MRSA).

METHODS

We conducted a pragmatic, cluster-randomized trial. Hospitals were randomly assigned to one of three strategies, with all adult ICUs in a given hospital assigned to the same strategy. Group 1 implemented MRSA screening and isolation; group 2, targeted decolonization (i.e., screening, isolation, and decolonization of MRSA carriers); and group 3, universal decolonization (i.e., no screening, and decolonization of all patients). Proportional-hazards models were used to assess differences in infection reductions across the study groups, with clustering according to hospital.

RESULTS

A total of 43 hospitals (including 74 ICUs and 74,256 patients during the intervention period) underwent randomization. In the intervention period versus the baseline period, modeled hazard ratios for MRSA clinical isolates were 0.92 for screening and isolation (crude rate, 3.2 vs. 3.4 isolates per 1000 days), 0.75 for targeted decolonization (3.2 vs. 4.3 isolates per 1000 days), and 0.63 for universal decolonization (2.1 vs. 3.4 isolates per 1000 days) ($P=0.01$ for test of all groups being equal). In the intervention versus baseline periods, hazard ratios for bloodstream infection with any pathogen in the three groups were 0.99 (crude rate, 4.1 vs. 4.2 infections per 1000 days), 0.78 (3.7 vs. 4.8 infections per 1000 days), and 0.56 (3.6 vs. 6.1 infections per 1000 days), respectively ($P<0.001$ for test of all groups being equal). Universal decolonization resulted in a significantly greater reduction in the rate of all bloodstream infections than either targeted decolonization or screening and isolation. One bloodstream infection was prevented per 54 patients who underwent decolonization. The reductions in rates of MRSA bloodstream infection were similar to those of all bloodstream infections, but the difference was not significant. Adverse events, which occurred in 7 patients, were mild and related to chlorhexidine.

CONCLUSIONS

In routine ICU practice, universal decolonization was more effective than targeted decolonization or screening and isolation in reducing rates of MRSA clinical isolates and bloodstream infection from any pathogen. (Funded by the Agency for Healthcare Research and the Centers for Disease Control and Prevention; REDUCE MRSA ClinicalTrials.gov number, NCT00980980.)

From the University of California Irvine School of Medicine, Orange (S.S.H., A.G., L.T., E.C.); Hospital Corporation of America, Houston (E.S.) and Nashville (J.M., J.H., J.B.P.); Texas A&M Health Science Center, Houston (E.S.); Harvard Medical School and Harvard Pilgrim Health Care Institute, Boston (K.K., T.R.A., J.L., F.H., K.H., R.E.K., R.P.); Rush Medical College (M.K.H., K.L.) and John Stroger Hospital of Cook County (R.A.W.), Chicago; Centers for Disease Control and Prevention, Atlanta (J.A.J.); and Washington University in St. Louis, St. Louis (V.J.F.). Address reprint requests to Dr. Huang at the Division of Infectious Diseases and Health Policy Research Institute, University of California Irvine School of Medicine, 101 City Dr., City Tower Suite 400, ZC 4081, Orange, CA 92868, or at sshuang@uci.edu.

*Investigators for the Centers for Disease Control and Prevention (CDC) Prevention Epicenters Program and the Agency for Healthcare Research and Quality (AHRQ) Developing Evidence to Inform Decisions about Effectiveness (DECIDE) Network and Healthcare-Associated Infections Program are listed in the Supplementary Appendix, available at NEJM.org.

This article was published on May 29, 2013, and updated on June 13, 2013, at NEJM.org.

N Engl J Med 2013;368:2255-65.
DOI: 10.1056/NEJMoa1207290

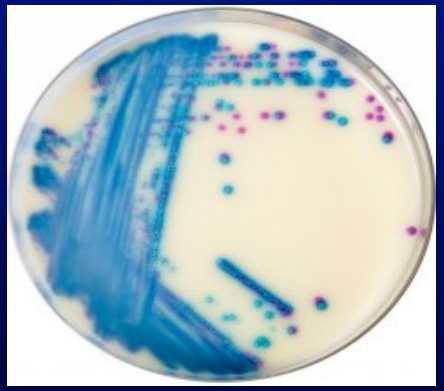
Study Limitations

- lack of surveillance for infections other than BSIs (clinical cultures used as a surrogate for infections)
- unblinded study may have resulted in unmeasured changes in behaviour by ICU staff
- no data on attributable benefit of mupirocin

A second scenario …

Your hospital does targeted VRE screening of "high risk" patients, and in "high risk" units. Only a few VRE infections are identified each year. Concerns have been raised that VRE screening has minimal benefit, is too costly, and adversely impacts patient flow and bed utilization.

What would you recommend?



What would you recommend?

1. Maintain status quo.
2. Intensify efforts; implement a universal screening program.
3. Stop all screening and isolation.
4. Stop all screening, but continue isolation.
5. Stop some screening, and continue isolation.

Current VRE Screening in Canadian Hospitals

- VRE screening decreased from 99% hospitals in 2010, to 90% hospitals in 2012 ($p<0.001$)
- In the hospitals that do screening: 68% targeted; 30% universal; 38% prevalence screens

Williams, Clin Microbiol Infect 2015

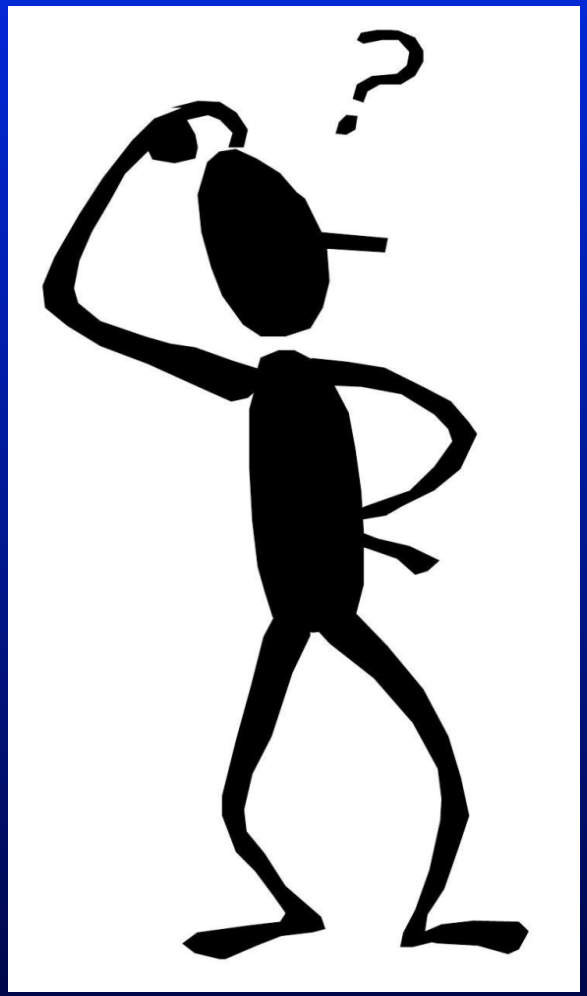
Why should we try to contain VRE in hospitals?

- In the absence of control measures, VRE colonization rates increase
- VRE colonization leads to VRE infection
- VRE infection has adverse outcomes
- VRE control is cost-effective

Why should we not try to contain VRE in hospitals?

- VRE colonization is of no concern
- VRE are “wimpy” pathogens
- VRE infections are now treatable
- VRE control is difficult and costly

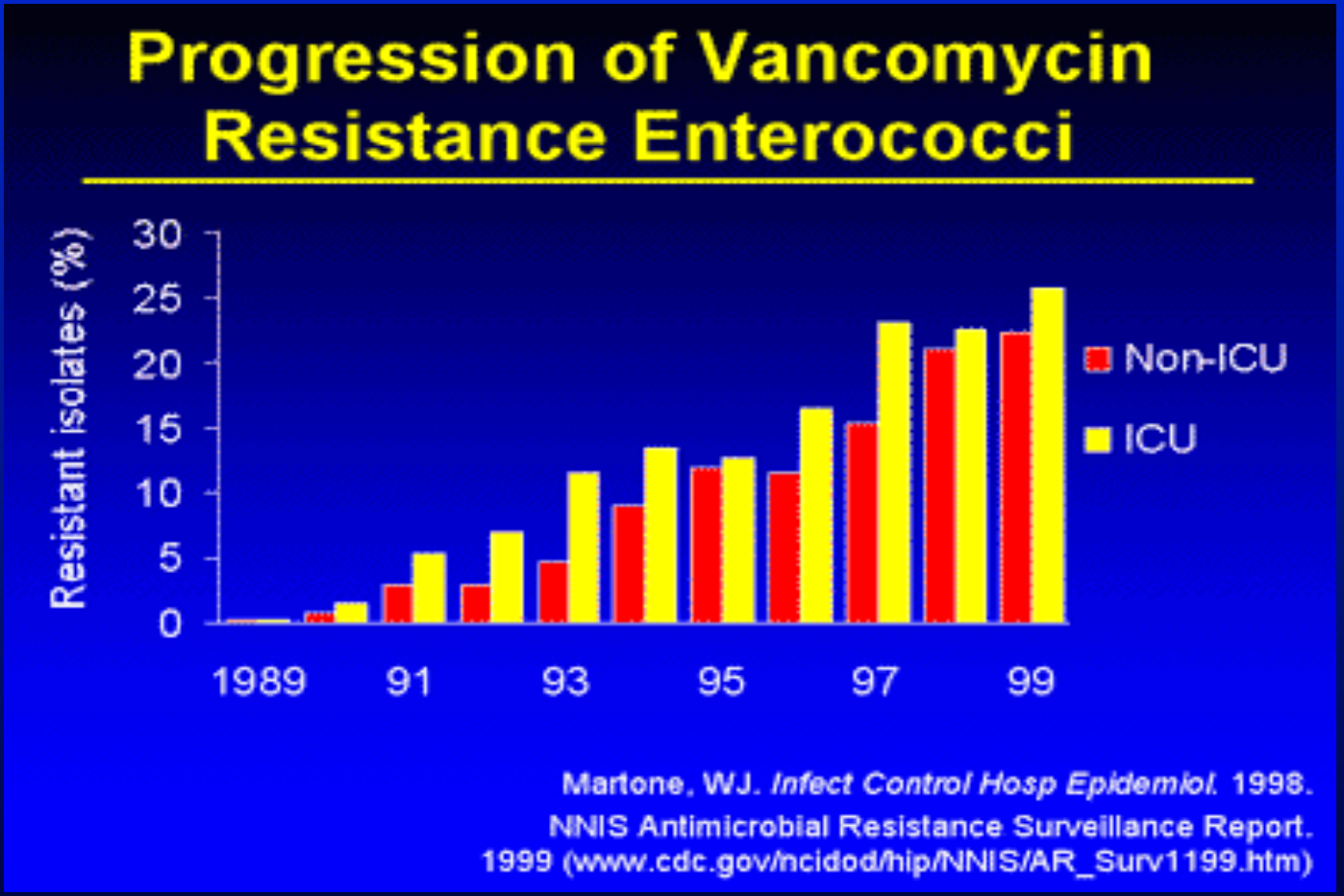
VRE Control



So what's the truth?

US Experience with VRE

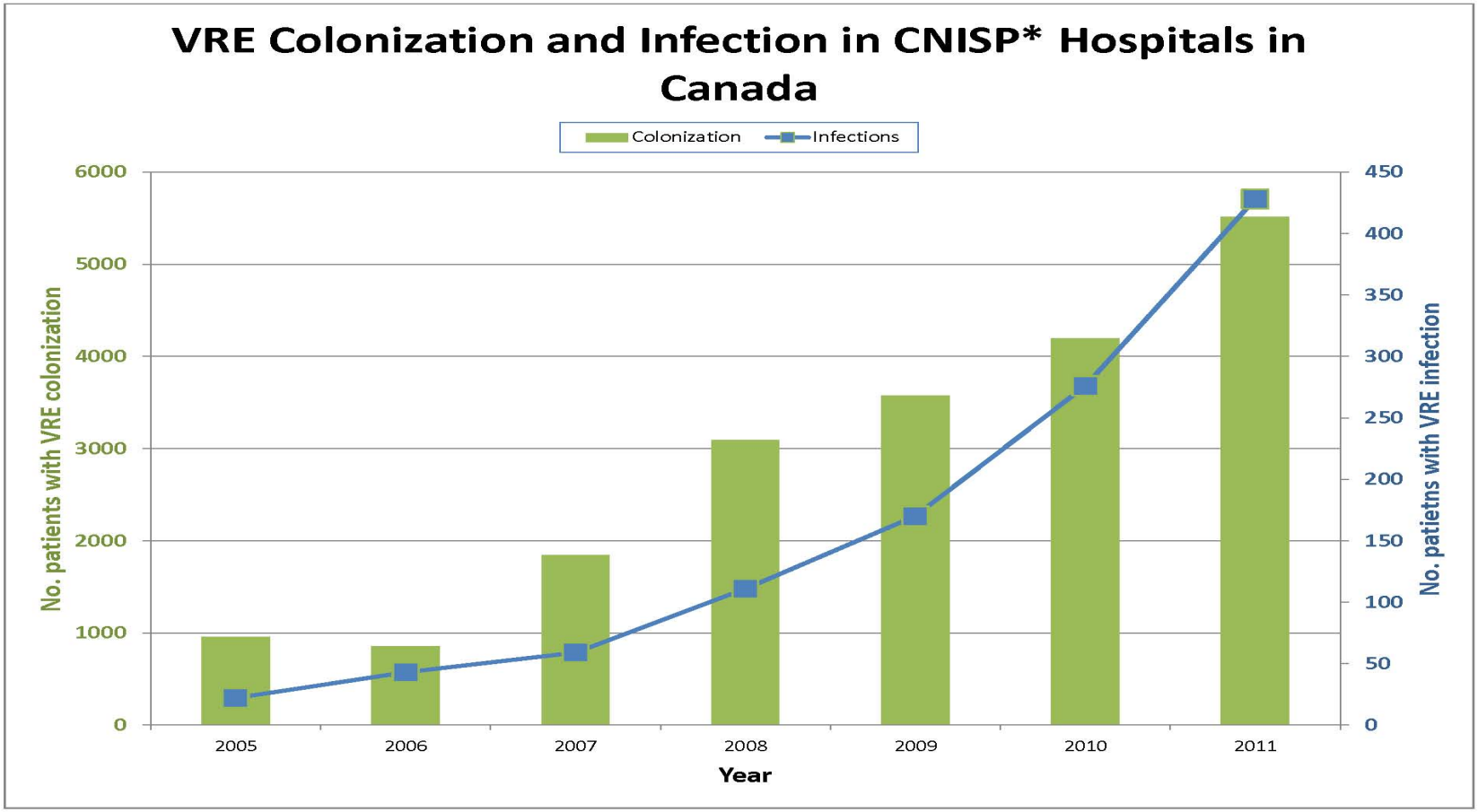
No efforts at VRE control for many years



US Experience with VRE

- From 1989-2001 VRE as a percent of clinical enterococcal isolates increased from 0.4% to 23% in ICUs and from 0.3% to 15% outside of ICUs
- Incidence of VRE infections and BSIs in US hospital more than doubled between 2003-2006

Martone, Infect Control Hosp Epidemiol 1998;
Ramsey, Infect Control Hosp Epidemiol 2009



Ofner-Agostini, Infect Control Hosp Epidemiol 2008;
Canadian Nosocomial Infection Surveillance Program

Risk of Bacteremia if VRE Colonized

Patient population	Risk of bacteremia in hospital if colonized
General hospital	4%
Cancer patients	2-29%
Solid organ transplant patients	6-12%
Bone marrow transplant patients	27-34%

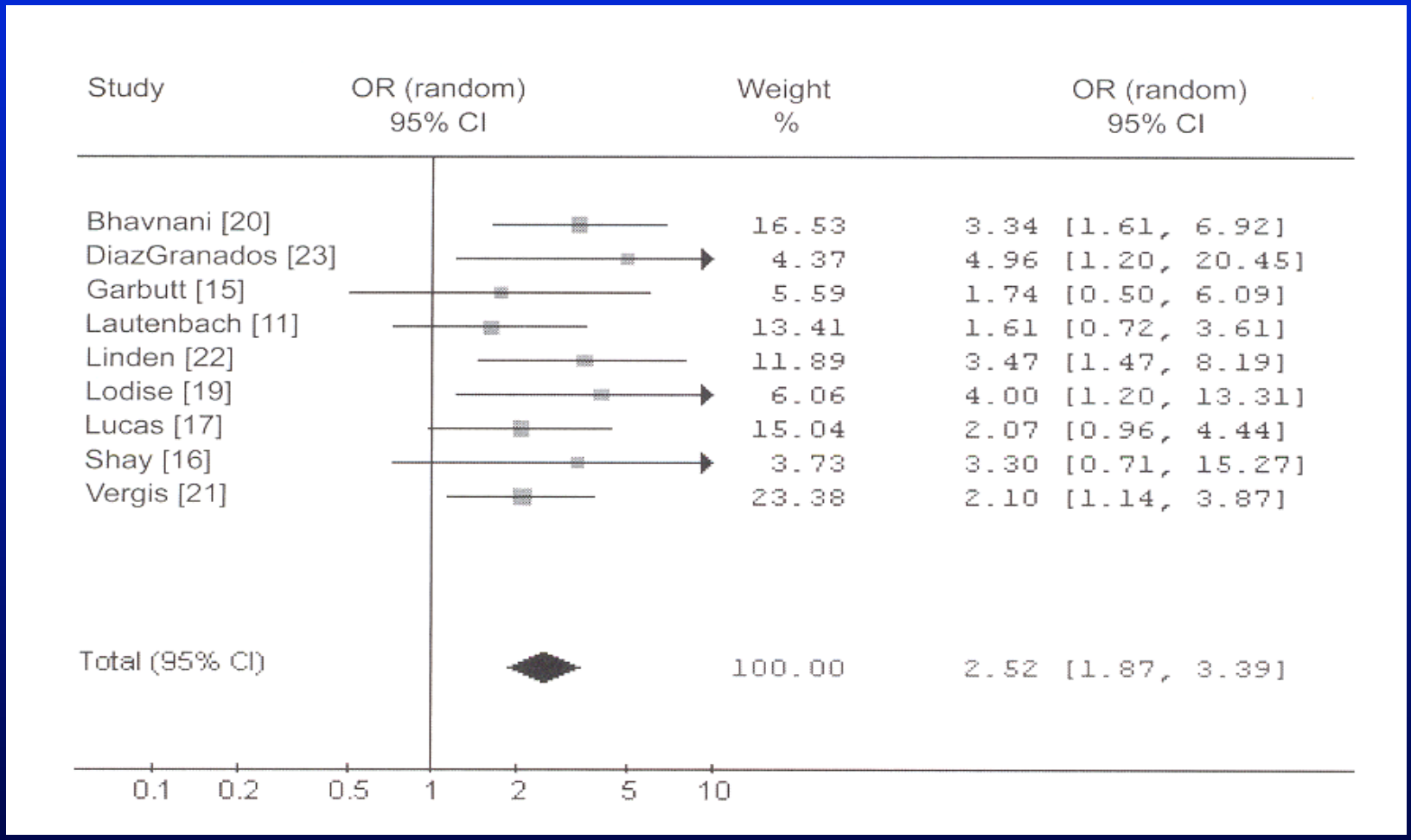
Olivier, Infect Control Hosp Epidemiol 2008

Consequences of VRE Colonization

- 1 in 10 risk of any VRE infection (50% occur post-discharge; 30% readmission)
- 1 in 25 risk of VRE bacteremia
- 1 in 200 risk of death due to VRE
- As compared to VSE, VRE infections associated with higher mortality, increased LOS and higher costs

Carmeli, Arch Intern Med 2002; Cosgrove, Clin Infect Dis 2003; Lloyd-Smith, J Hosp Infect 2013

Mortality Associated with VRE Bacteremia



DiazGranados, Clin Infect Dis 2005

VRE Treatment

- Newer drugs are now available (linezolid, daptomycin).

- But resistance has already appeared, and has outcome improved?.

(Dobbs, J Clin Microbiol 2006;
Scheetz, Antimicrob Agents Chemother 2008)

Does VRE Screening Reduce the Incidence of VRE BSIs?

- 2 teaching hospitals in Chicago, approx. 700-beds each, with similar # admissions, # ICU beds, clinical programs
- Hospital A did not screen for VRE; Hospital B screened (targeted screening high-risk patients)
- Measured VRE BSI rates, 1991-1996

Price, Clin Infect Dis 2003

Does VRE Screening Reduce the Incidence of VRE BSIs?

	Hospital A	Hospital B
VRE screening	No	Yes
DDD Vancomycin per 1000 pt-days	70.3	65.5
No. patients VRE BSI (1991-1996)	218	71
VRE BSI rate per 10,000 pt-days	1.7	0.08

Price, Clin Infect Dis 2003

Is VRE Control Cost-Effective?

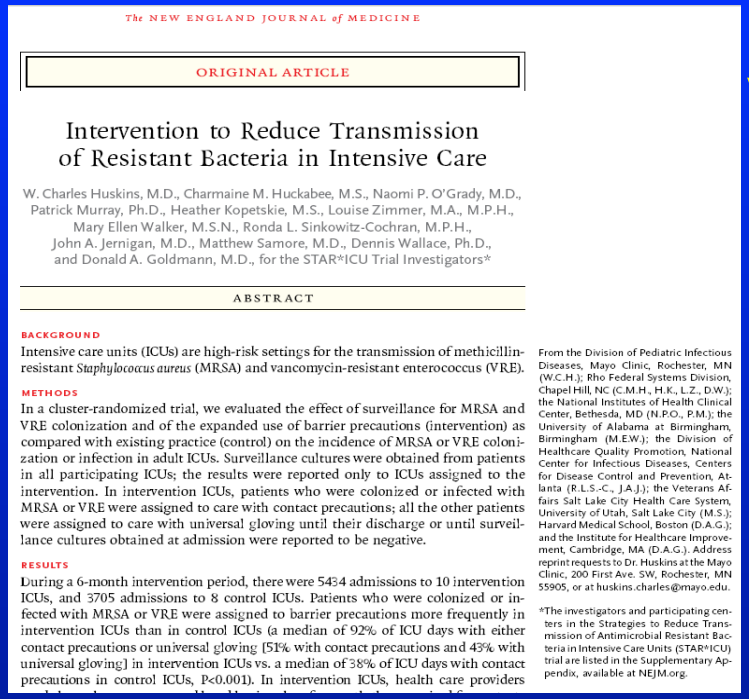
- Compared costs associated with VRE BSIs in two 700-bed, university-affiliated tertiary-care hospitals for 2 years (1995-1996); one with a VRE control program (screening/isolation) and one without.

Muto, Infect Control Hosp Epidemiol 2002

Is VRE Control Cost Effective?

	U Virginia	Baltimore VA Med Center
Cost of control	$253,099	-
No. VRE BSIs	1	28
Deaths, VRE BSI	0	6
Cost, VRE BSIs	$27,190	$761,320
Total cost, VRE (excl. non-BSI infections)	$280,289	$761,320

Muto, Infect Control Hosp Epidemiol 2002



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Intervention to Reduce Transmission of Resistant Bacteria in Intensive Care

W. Charles Huskins, M.D., Charmaine M. Huckabee, M.S., Naomi P. O'Grady, M.D., Patrick Murray, Ph.D., Heather Kopetskie, M.S., Louise Zimmer, M.A., M.P.H., Mary Ellen Walker, M.S.N., Ronda L. Sinkowitz-Cochran, M.P.H., John A. Jernigan, M.D., Matthew Samore, M.D., Dennis Wallace, Ph.D., and Donald A. Goldmann, M.D., for the STAR*ICU Trial Investigators*

ABSTRACT

BACKGROUND

Intensive care units (ICUs) are high-risk settings for the transmission of methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococcus (VRE).

METHODS

In a cluster-randomized trial, we evaluated the effect of surveillance for MRSA and VRE colonization and of the expanded use of barrier precautions (intervention) as compared with existing practice (control) on the incidence of MRSA or VRE colonization or infection in adult ICUs. Surveillance cultures were obtained from patients in all participating ICUs; the results were reported only to ICUs assigned to the intervention. In intervention ICUs, patients who were colonized or infected with MRSA or VRE were assigned to care with contact precautions; all the other patients were assigned to care with universal gloving until their discharge or until surveillance cultures obtained at admission were reported to be negative.

RESULTS

During a 6-month intervention period, there were 5434 admissions to 10 intervention ICUs, and 3705 admissions to 8 control ICUs. Patients who were colonized or infected with MRSA or VRE were assigned to barrier precautions more frequently in intervention ICUs than in control ICUs (a median of 92% of ICU days with either contact precautions or universal gloving [51% with contact precautions and 43% with universal gloving] in intervention ICUs vs. a median of 38% of ICU days with contact precautions in control ICUs, P<0.001). In intervention ICUs, health care providers

From the Division of Pediatric Infectious Diseases, Mayo Clinic, Rochester, MN (W.C.H.); Rho Federal Systems Division, Chapel Hill, NC (C.M.H., H.K., L.Z., D.W.); the National Institutes of Health Clinical Center, Bethesda, MD (N.P.O., P.M.); the University of Alabama at Birmingham, Birmingham (M.E.W.); the Division of Healthcare Quality Promotion, National Center for Infectious Diseases, Centers for Disease Control and Prevention, Atlanta (R.L.S.-C., J.A.J.); the Veterans Affairs Salt Lake City Health Care System, University of Utah, Salt Lake City (M.S.); Harvard Medical School, Boston (D.A.G.); and the Institute for Healthcare Improvement, Cambridge, MA (D.A.G.). Address reprint requests to Dr. Huskins at the Mayo Clinic, 200 First Ave. SW, Rochester, MN 55905, or at huskins.charles@mayo.edu.

*The investigators and participating centers in the Strategies to Reduce Transmission of Antimicrobial Resistant Bacteria in Intensive Care Units (STAR*ICU) trial are listed in the Supplementary Appendix, available at NEJM.org.

VRE Screening in ICUs: RCT

No impact on incidence per 1000 ICU pt-days

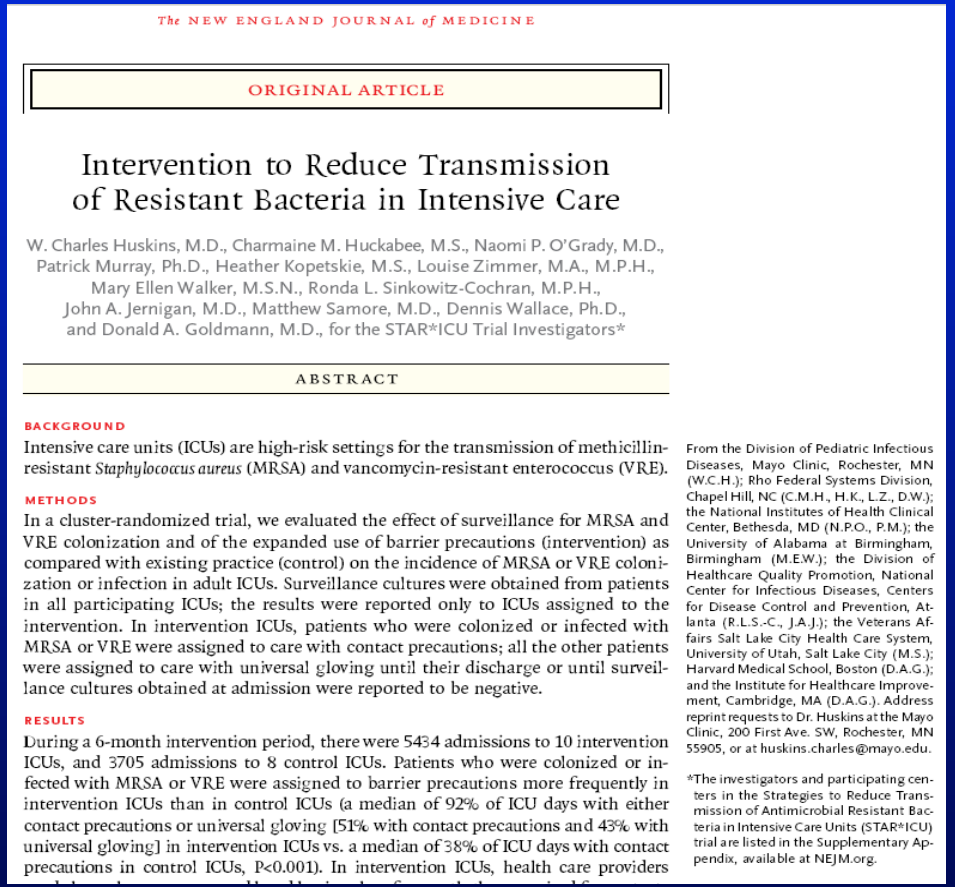
Intervention ICUs		Control ICUs
25.7	Baseline	27.1
36.8	Intervention	29.9

Huskins, N Engl J Med 2011

VRE Screening in ICUs

Study Limitations:

- High prevalence at baseline; perhaps 6 mos. not enough time
- Long delay in getting results (mean, 5-6 days)
- Poor compliance with contact precautions



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Intervention to Reduce Transmission of Resistant Bacteria in Intensive Care

W. Charles Huskins, M.D., Charmaine M. Huckabee, M.S., Naomi P. O'Grady, M.D., Patrick Murray, Ph.D., Heather Kopetskie, M.S., Louise Zimmer, M.A., M.P.H., Mary Ellen Walker, M.S.N., Ronda L. Sinkowitz-Cochran, M.P.H., John A. Jernigan, M.D., Matthew Samore, M.D., Dennis Wallace, Ph.D., and Donald A. Goldmann, M.D., for the STAR*ICU Trial Investigators*

ABSTRACT

BACKGROUND

Intensive care units (ICUs) are high-risk settings for the transmission of methicillin-resistant *Staphylococcus aureus* (MRSA) and vancomycin-resistant enterococcus (VRE).

METHODS

In a cluster-randomized trial, we evaluated the effect of surveillance for MRSA and VRE colonization and of the expanded use of barrier precautions (intervention) as compared with existing practice (control) on the incidence of MRSA or VRE colonization or infection in adult ICUs. Surveillance cultures were obtained from patients in all participating ICUs; the results were reported only to ICUs assigned to the intervention. In intervention ICUs, patients who were colonized or infected with MRSA or VRE were assigned to care with contact precautions; all the other patients were assigned to care with universal gloving until their discharge or until surveillance cultures obtained at admission were reported to be negative.

RESULTS

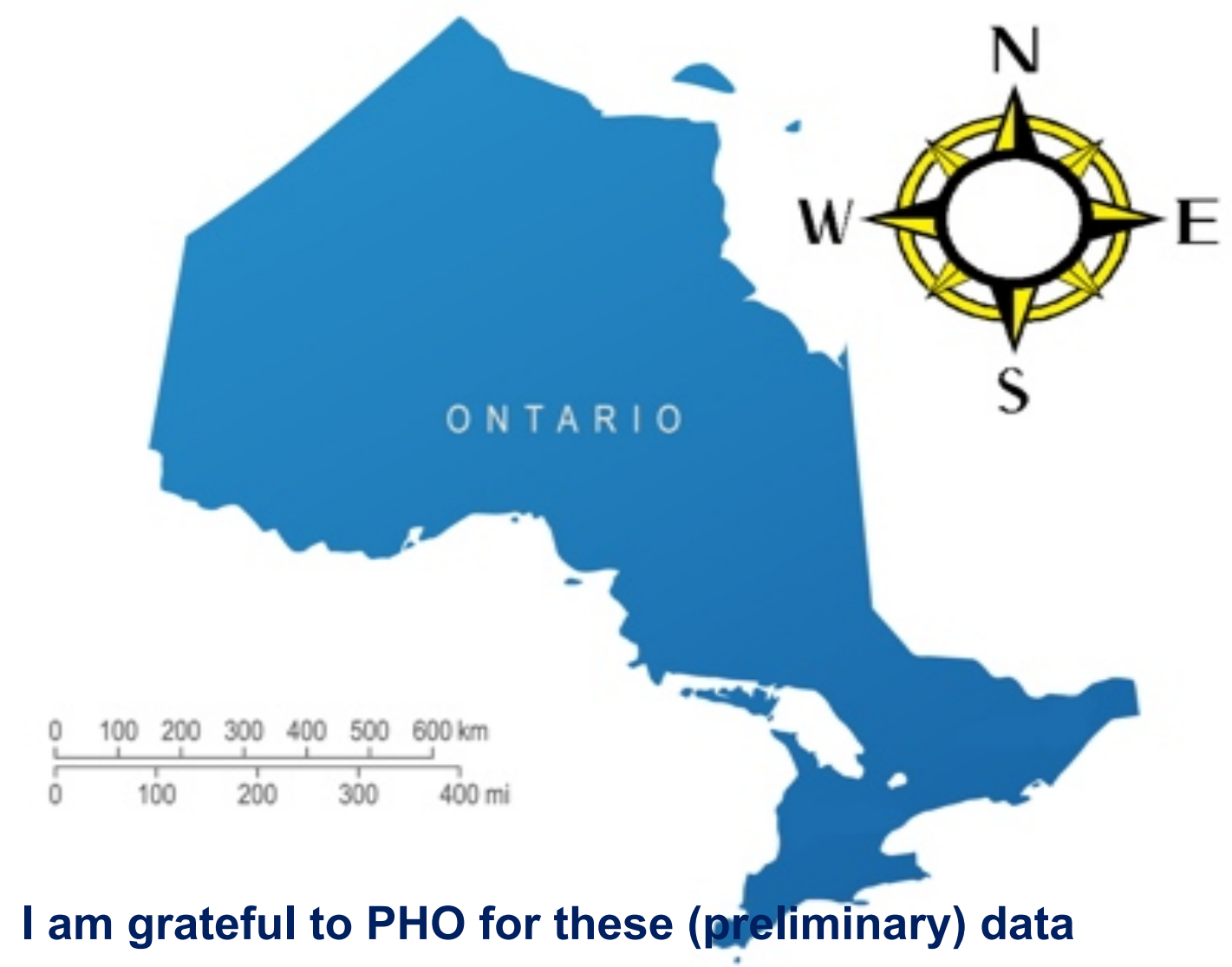
During a 6-month intervention period, there were 5434 admissions to 10 intervention ICUs, and 3705 admissions to 8 control ICUs. Patients who were colonized or infected with MRSA or VRE were assigned to barrier precautions more frequently in intervention ICUs than in control ICUs (a median of 92% of ICU days with either contact precautions or universal gloving [51% with contact precautions and 43% with universal gloving] in intervention ICUs vs. a median of 38% of ICU days with contact precautions in control ICUs, P<0.001). In intervention ICUs, health care providers

From the Division of Pediatric Infectious Diseases, Mayo Clinic, Rochester, MN (W.C.H.); Rho Federal Systems Division, Chapel Hill, NC (C.M.H., H.K., L.Z., D.W.); the National Institutes of Health Clinical Center, Bethesda, MD (N.P.O., P.M.); the University of Alabama at Birmingham, Birmingham (M.E.W.); the Division of Healthcare Quality Promotion, National Center for Infectious Diseases, Centers for Disease Control and Prevention, Atlanta (R.L.S.-C., J.A.J.); the Veterans Affairs Salt Lake City Health Care System, University of Utah, Salt Lake City (M.S.); Harvard Medical School, Boston (D.A.G.); and the Institute for Healthcare Improvement, Cambridge, MA (D.A.G.). Address reprint requests to Dr. Huskins at the Mayo Clinic, 200 First Ave. SW, Rochester, MN 55905, or at huskins.charles@mayo.edu.

*The investigators and participating centers in the Strategies to Reduce Transmission of Antimicrobial Resistant Bacteria in Intensive Care Units (STAR*ICU) trial are listed in the Supplementary Appendix, available at NEJM.org.

Huskins, N Engl J Med 2011

A VRE Experiment in Ontario



I am grateful to PHO for these (preliminary) data

VRE Control – A Natural Experiment in Ontario

- In June 2012, 4 teaching hospitals stopped VRE screening and control programs; 148 hospitals maintained their VRE control program.
- Prospective comparison of VRE BSI rates in screening vs non-screening hospitals

F. Lam, J. Johnstone, G. Garber, PHO; presented at IDSA, 2014

- Both screening and non-screening hospitals saw increased rates of VRE+ blood cultures between July 2012 and June 2014; however, the rate of increase amongst non-screening hospitals was different than screening hospitals (interaction $p<0.001$) (Figure 1).

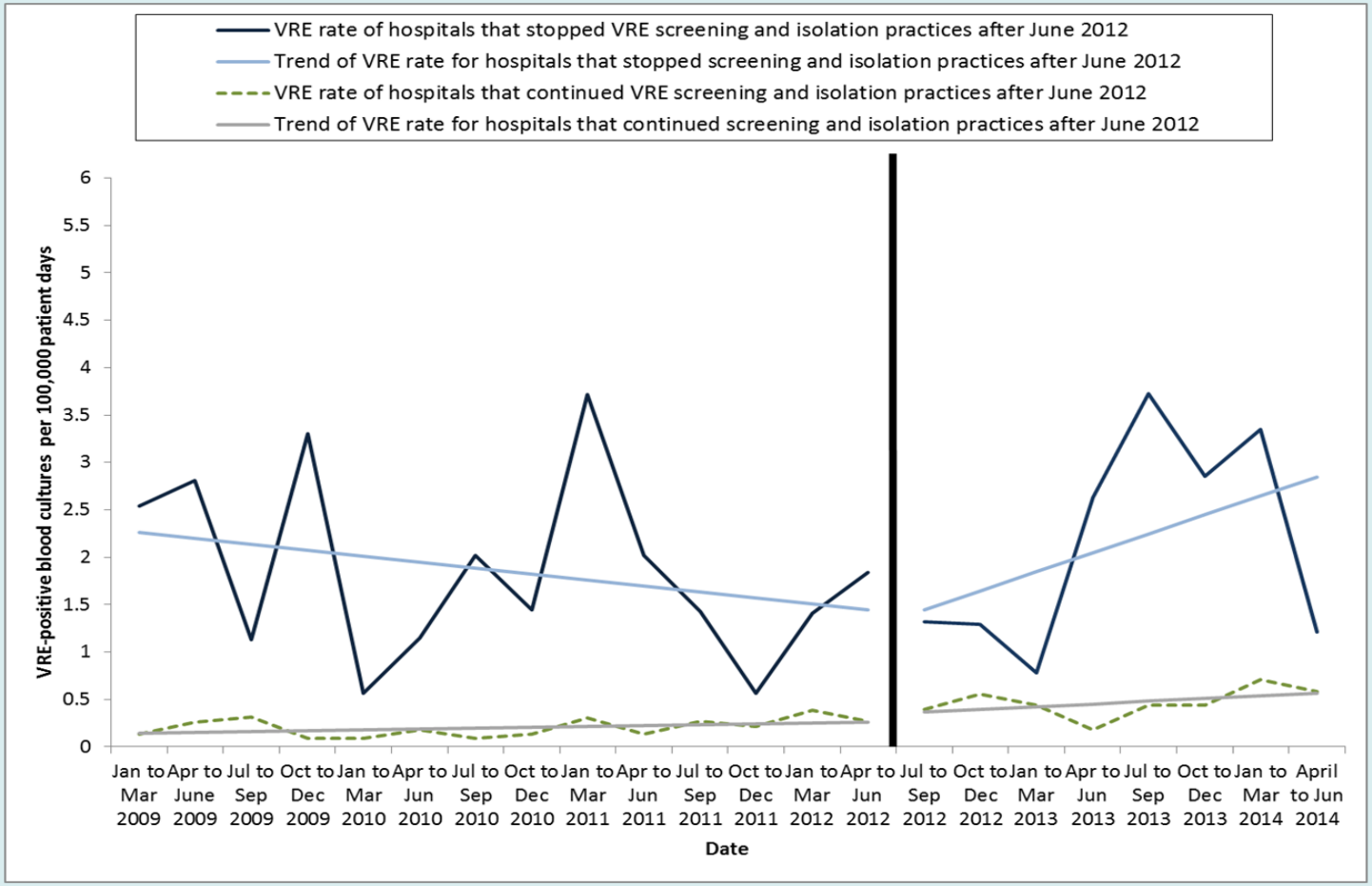


Figure 1. Total VRE+ blood culture rate by screening and non-screening hospitals.

Lam, Johnstone, Garber, PHO; IDSA 2014

- Between July 2012 and June 2014, the VRE+ blood culture rate at non-screening acute teaching hospitals increased, while the VRE rate at screening acute teaching hospitals decreased (interaction p=0.006) (Figure 2).

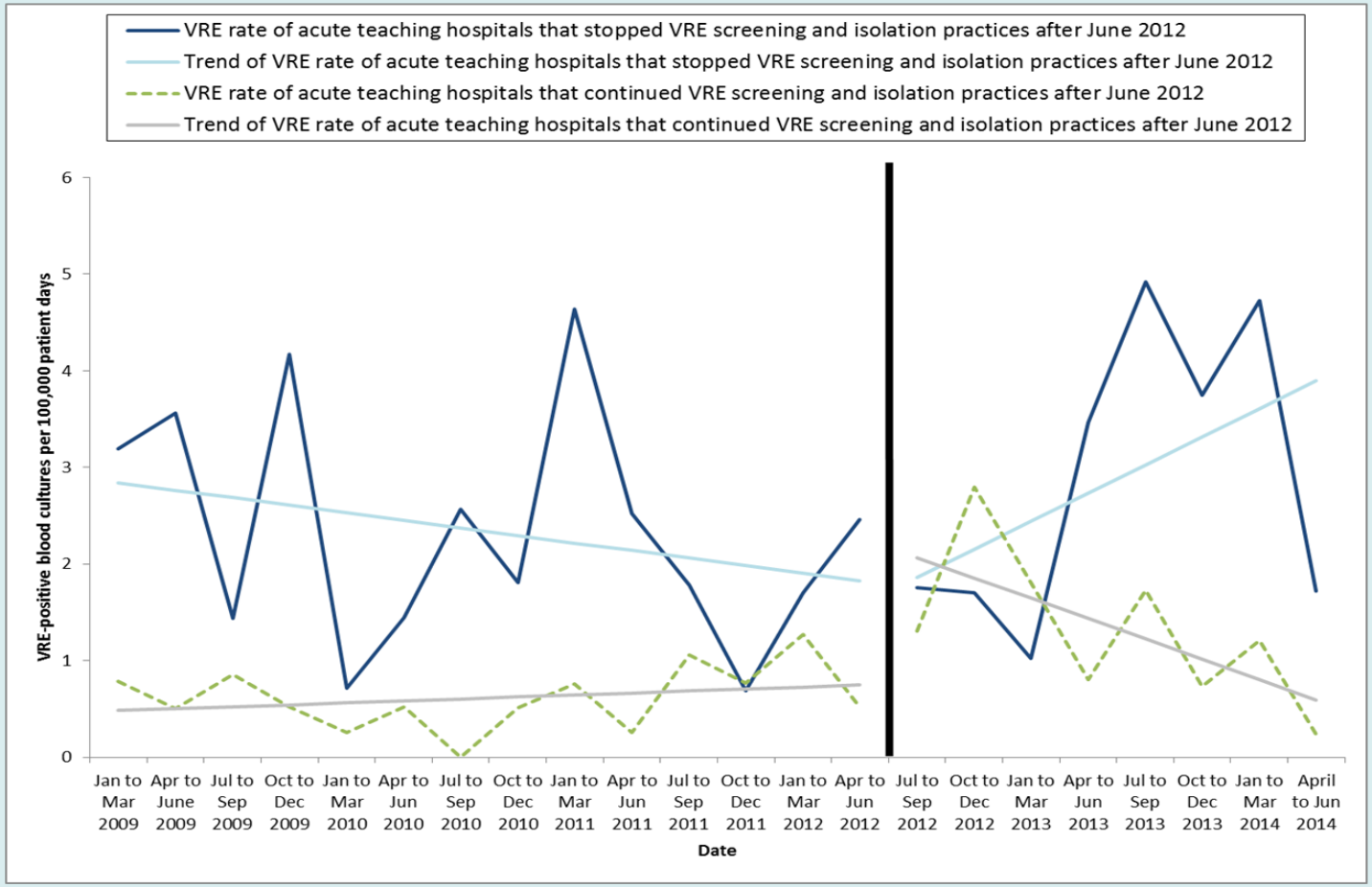
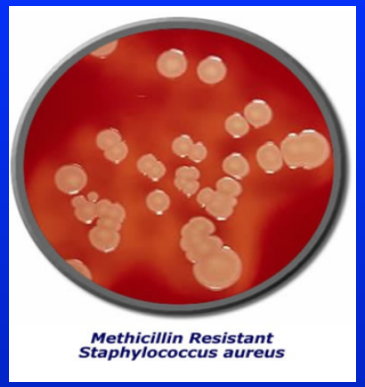
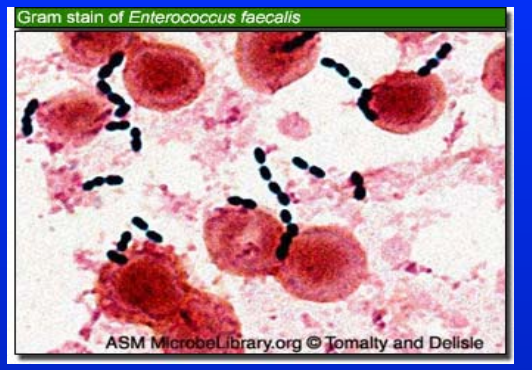


Figure 2. Total VRE+ blood culture rate by screening and non-screening acute teaching hospitals.

Lam, Johnstone, Garber, PHO; IDSA 2014



Conclusions



- CHG +/- mupirocin appears to reduce MRSA acquisition and nosocomial BSIs in ICUs.
- The value of VRE screening remains contentious, but there is evidence suggesting it may be cost-effective.