# Point/Counterpoint: Contact Precautions for MRSA/VRE: Is it Really Necessary?

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# Objectives

Define current recommendations from the CDC and SHEA to prevent transmission of  Multi-Drug Resistant organisms

Evaluate current literature addressing discontinuation of Contact Precautions for MRSA and VRE

Comprehend requirements of  horizontal vs targeted measures to prevent transmission of Multi-Drug Resistant organisms

# Barry Farr – in memoriam

CHARLOTTESVILLE, Va. — Dr. Barry Farr, 65, of Charlottesville, Va., and formerly of Greenville, died Wednesday, Feb. 15, 2017, in Charlottesville, Va. He grew up in Greenville, the son of the late Dr. Lewis Farr and Alice Miller Farr.

# Healthcare associated infections in US adults

| Infection | Total annual cases | Attributable LOS (days) | Cost/infection | Total annual cost ($, billions) |
|---|---|---|---|---|
| SSI | 158,369 | 11.2 | $20,785 | 3.30 |
| CLABSI | 40,411 | 10.4 | $45,814 | 1.85 |
| CAUTI | 77,079 | | $896 | 0.28 |
| VAP | 31,130 | 13.1 | $40,144 | 3.09 |
| C. difficile | 133,657 | 3.3 | $11,285 | 1.51 |

**Total number of HAIs = 440,000**

**Total direct cost = $9.8 billion**

Zimlichman E et al. JAMA Intern Med 2013; 173:2039-46.

TABLE 4. Distribution and Rank Order of Pathogens Frequently Reported to the National Healthcare Safety Network (NHSN), by Type of Healthcare-Associated Infection (HAI), 2011–2014

| Pathogen | Overall | | CLABSI | | CAUTI | | VAP[a] | | SSI | |
|---|---|---|---|---|---|---|---|---|---|---|
| | No. (%) of pathogens | Rank[b] | No. (%) of pathogens | Rank[b] | No. (%) of pathogens | Rank[b] | No. (%) of pathogens | Rank[b] | No. (%) of pathogens | Rank[b] |
| *Escherichia coli* | 62,904 (15.4) | 1 | 5,193 (5.4) | 7 | 36,806 (23.9) | 1 | 476 (5.4) | 6 | 20,429 (13.7) | 2 |
| *Staphylococcus aureus* | 48,302 (11.8) | 2 | 12,706 (13.2) | 2 | 2,515 (1.6) | 14 | 2,179 (24.7) | 1 | 30,902 (20.7) | 1 |
| *Klebsiella (pneumoniae/oxytoca)* | 31,498 (7.7) | 3 | 8,062 (8.4) | 4 | 15,471 (10.1) | 4 | 898 (10.2) | 3 | 7,067 (4.7) | 6 |
| Coagulase-negative staphylococci[c] | 31,361 (7.7) | 4 | 15,794 (16.4) | 1 | 3,696 (2.4) | 13 | 72 (0.8) | 13 | 11,799 (7.9) | 3 |
| *Enterococcus faecalis*[d] | 30,034 (7.4) | 5 | 8,118 (8.4) | 3 | 10,728 (7.0) | 5 | 32 (0.4) | 21 | 11,156 (7.5) | 4 |
| *Pseudomonas aeruginosa* | 29,636 (7.3) | 6 | 3,881 (4.0) | 10 | 15,848 (10.3) | 3 | 1,449 (16.5) | 2 | 8,458 (5.7) | 5 |
| *Candida albicans*[d] | 27,231 (6.7) | 7 | 5,761 (6.0) | 6 | 17,926 (11.7) | 2 | 193 (2.2) | 10 | 3,351 (2.2) | 12 |
| *Enterobacter* spp[c] | 17,235 (4.2) | 8 | 4,204 (4.4) | 9 | 5,689 (3.7) | 9 | 727 (8.3) | 4 | 6,615 (4.4) | 8 |
| *Enterococcus faecium*[d] | 14,942 (3.7) | 9 | 6,567 (6.8) | 5 | 4,212 (2.7) | 11 | 23 (0.3) | 24 | 4,140 (2.8) | 11 |
| Other *Enterococcus* spp.[d] | 14,694 (3.6) | 10 | 1,974 (2.0) | 14 | 6,291 (4.1) | 7 | 19 (0.2) | 27 | 6,410 (4.3) | 9 |
| *Proteus* spp.[c] | 11,249 (2.8) | 11 | 820 (0.8) | 17 | 6,108 (4.0) | 8 | 125 (1.4) | 12 | 4,196 (2.8) | 10 |
| Yeast NOS[e] | 10,811 (2.6) | 12 | 763 (0.8) | 18 | 9,443 (6.1) | 6 | 54 (0.6) | 16 | 551 (0.4) | 25 |
| Other *Candida* spp.[d] | 10,641 (2.6) | 13 | 4,730 (4.9) | 8 | 5,178 (3.4) | 10 | 37 (0.4) | 19 | 696 (0.5) | 19 |
| *Candida glabrata*[d] | 8,121 (2.0) | 14 | 3,314 (3.4) | 11 | 4,121 (2.7) | 12 | 12 (0.1) | 33 | 674 (0.5) | 20 |
| *Bacteroides* spp. | 7,560 (1.9) | 15 | 515 (0.5) | 19 | 2 (<0.1) | 130 | 2 (<0.1) | 72 | 7,041 (4.7) | 7 |
| Other pathogen | 51,932 (12.7) | | 14,130 (14.6) | | 9,771 (6.4) | | 2,507 (28.5) | | 25,524 (17.1) | |
| Total | 408,151 (100) | | 96,532 (100) | | 153,805 (100) | | 8,805 (100) | | 149,009 (100) | |

NOTE. CAUTI, catheter-associated urinary tract infection; CLABSI, central line-associated bloodstream infection; NOS, not otherwise specified; SSI, surgical site infection; VAP, ventilator-associated pneumonia.

[a]This report includes VAP data from 2011–2012 only.

[b]The 15 most common pathogens are listed in this table and ranked according to how frequently they were reported to NHSN. The rankings were established based on all pathogens reported.

[c]Among all HAIs, the following species were frequently reported but considered part of a larger pathogen group for this table: *Staphylococcus epidermidis* (12,562 pathogens reported), *Enterobacter cloacae* (11,269), and *Proteus mirabilis* (10,559).

[d]For informational purposes, select pathogens were also categorized at the combined genus-level with the following results: All *Enterococcus* species (*E. faecalis*, *E. faecium*, and other species) were ranked Overall (2), CLABSI (1), CAUTI (3), VAP (11), SSI (2) and all *Candida* species (*C. albicans*, *C. glabrata*, and other species) were ranked Overall (4), CLABSI (3), CAUTI (2), VAP (9), SSI (10).

[e]Other non-*Candida* yeast, or yeast not otherwise specified.

TABLE 6. Percent of Pathogens Reported From Central Line–Associated Bloodstream Infections (CLABSIs) That Tested Resistant to Selected Antimicrobial Agents, by Period, 2011–2014

| | 2011 | | | 2012 | | | 2013 | | | 2014 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Pathogen, antimicrobial | No. of isolates reported | % of isolates tested[a] | % Resistance | No. of isolates reported | % of isolates tested[a] | % Resistance | No. of isolates reported | % of isolates tested[a] | % Resistance | No. of isolates reported | % of isolates tested[a] | % Resistance |
| *Staphylococcus aureus* | 3,022 | | | 3,087 | | | 3,358 | | | 3,239 | | |
| OX/METH/CEFOX | | 93.3 | 52.6 | | 92.6 | 51.1 | | 91.0 | 52.3 | | 90.3 | 50.7 |
| *Enterococcus* spp. | | | | | | | | | | | | |
| *E. faecium* | 1,550 | | | 1,532 | | | 1,756 | | | 1,729 | | |
| VAN | | 95.7 | 83.8 | | 96.2 | 83.3 | | 94.3 | 83.0 | | 94.8 | 82.2 |
| *E. faecalis* | 1,984 | | | 2,080 | | | 2,107 | | | 1,947 | | |
| VAN | | 93.5 | 9.9 | | 93.2 | 10.1 | | 93.5 | 9.3 | | 93.9 | 9.8 |
| *Klebsiella (pneumoniae/oxytoca)* | 1,851 | | | 1,936 | | | 2,075 | | | 2,200 | | |
| ESC4 | | 85.6 | 28.3 | | 84.9 | 28.1 | | 85.8 | 28.5 | | 85.1 | 24.1 |
| Carbapenems | | 74.8 | 11.3 | | 75.8 | 13.0 | | 74.8 | 13.1 | | 73.3 | 10.9 |
| MDR1 | | 90.2 | 20.9 | | 91.6 | 20.3 | | 92.9 | 20.3 | | 92.6 | 17.2 |
| *Escherichia coli* | 956 | | | 1,167 | | | 1,475 | | | 1,595 | | |
| ESC4 | | 85.1 | 19.7 | | 83.5 | 22.2 | | 84.9 | 24.4 | | 84.6 | 22.2 |
| FQ3 | | 91.6 | 41.1 | | 90.8 | 42.5 | | 89.4 | 47.8 | | 90.1 | 49.3 |
| Carbapenems | | 74.4 | 1.3 | | 73.2 | 1.3 | | 71.2 | 2.1 | | 70.9 | 1.9 |
| MDR1 | | 90.2 | 11.1 | | 90.7 | 13.8 | | 92.1 | 14.9 | | 90.9 | 14.1 |
| *Enterobacter* spp. | 1,000 | | | 1,029 | | | 1,106 | | | 1,069 | | |
| ESC4 | | 93.5 | 37.3 | | 91.6 | 38.2 | | 91.9 | 37.7 | | 89.8 | 36.1 |
| Carbapenems | | 76.7 | 3.0 | | 74.2 | 5.2 | | 72.8 | 6.2 | | 70.7 | 6.6 |
| MDR1 | | 93.9 | 8.1 | | 93.1 | 10.0 | | 93.2 | 10.4 | | 92.2 | 9.5 |
| *Pseudomonas aeruginosa* | 888 | | | 877 | | | 1,100 | | | 1,016 | | |
| AMINOS | | 92.5 | 22.0 | | 96.9 | 17.5 | | 94.5 | 20.5 | | 94.0 | 17.2 |
| ESC2 | | 92.1 | 27.1 | | 95.2 | 23.2 | | 92.5 | 26.6 | | 92.7 | 24.2 |
| FQ2 | | 93.8 | 33.1 | | 92.9 | 28.3 | | 90.5 | 31.4 | | 92.2 | 30.2 |
| Carbapenems | | 83.8 | 28.4 | | 84.3 | 23.7 | | 83.1 | 25.4 | | 80.9 | 25.8 |
| PIP/ PIPTAZ | | 81.0 | 19.9 | | 82.3 | 17.9 | | 84.6 | 19.0 | | 87.2 | 18.4 |
| MDR2 | | 95.0 | 21.7 | | 96.9 | 16.7 | | 93.9 | 19.0 | | 94.4 | 17.9 |
| *Acinetobacter* spp. | 544 | | | 572 | | | 538 | | | 495 | | |
| Carbapenems | | 83.3 | 57.2 | | 82.7 | 49.5 | | 79.7 | 53.1 | | 76.4 | 46.6 |
| MDR3 | | 96.3 | 60.9 | | 95.3 | 51.6 | | 95.2 | 52.7 | | 92.9 | 43.7 |

NOTE. OX/METH/CEFOX, oxacillin/methicillin/cefoxitin; VAN, vancomycin; ESC4, extended-spectrum cephalosporin (cefepime, cefotaxime, ceftazidime, ceftriaxone); Carbapenems (imipenem, meropenem, doripenem); MDR1, multidrug-resistance (must test either intermediate [I] or resistant [R] to at least 1 drug in 3 of the 5 following classes [ESC4, FQ3, AMINO, carbapenems, & PIP/PIPTAZ]); FQ3, fluoroquinolones (ciprofloxacin, levofloxacin, moxifloxacin); AMINOS, aminoglycosides (amikacin, gentamicin, tobramycin); ESC2, extended-spectrum cephalosporin (cefepime, ceftazidime); FQ2, fluoroquinolones (ciprofloxacin, levofloxacin); PIP, piperacillin; PIPTAZ, piperacillin/tazobactam; MDR2, multidrug-resistance (must test either I or R to at least 1 drug in 3 of the 5 following classes [ESC2, FQ2, AMINOS, carbapenems, & PIP/PIPTAZ]); MDR3, multidrug-resistance (must test either I or R to at least 1 drug in 3 of the 6 following classes [ESC4, FQ2, AMINOS, carbapenems, PIP/PIPTAZ & ampicillin/sulbactam]).

[a]If the percent of isolates tested is less than 70%, caution should be used when interpreting the percent resistance.

# CDC Management of Multidrug-Resistant Organisms in Healthcare Settings, 2006

***Important concepts in transmission.*** Once MDROs are introduced into a healthcare setting, transmission and persistence of the resistant strain is determined by the availability of vulnerable patients, selective pressure exerted by antimicrobial use, increased potential for transmission from larger numbers of colonized or infected patients ("colonization pressure") (101, 102); and the impact of implementation and adherence to prevention efforts. Patients vulnerable to colonization and infection include those with severe disease, especially those with compromised host defenses from underlying medical conditions; recent surgery; or indwelling medical devices (e.g.,

# Intensified Interventions – Tier 2

- When incidence or prevalence of MDROs are not decreasing despite implementation of and correct adherence to the routine control measures described above, intensify MDRO control efforts by adopting one or more of the interventions described below. (92, 152, 183, 184, 193, 365) *Category IB*

- V.B.1.a.ii. When the *first* case or outbreak of an epidemiologically important MDRO (e.g., VRE, MRSA, VISA, VRSA, MDR-GNB) is identified within a healthcare facility or unit. (22, 23, 25, 68, 170, 172, 184, 240, 242, 378) *Category IB*

# Denmark – search and destroy strategy

Search and destroy

- Screen high-risk patients before hospital admission
- Environmental cleaning
- Contact Precautions
- Screen healthcare workers
  - Positive – sent home with pay, treated with mupirocin. Family and pets screened and treated if positive.
  - Thorough cleaning of home

Low prevalence of methicillin-resistant *Staphylococcus aureus* (MRSA) at hospital admission in the Netherlands: the value of search and destroy and restrictive antibiotic use

H.F.L Wertheim, M.C Vos, H.A.M Boelens, A Voss, C.M.J.E Vandenbroucke-Grauls, M.H.M Meester, J.A.J.W Kluytmans, P.H.J van Keulen, H.A Verbrugh

H.F.L. Wertheim et al. Low prevalence of methicillin-resistant Staphylococcus aureus (MRSA) at hospital admission in the Netherlands: the value of search and destroy and restrictive antibiotic use. Journal of *Hospital Infection.* April 2004 Volume 56, Issue 4, pages 321-325.

# Mike the Mad Biologist

*Helping idiots who desperately need my assistance by calling them fucking morons since 2004*

Home About

## MRSA and 'Search and Destroy'

Posted on October 26, 2006

I have discussed the "search and destroy" strategy for controlling and reducing methicillin resistant *Staphylococcus aureus* (MRSA) before. Search-and-destroy involves the screening of every patient and hospital worker for MRSA.

Patients with MRSA are isolated to prevent spread to other patients. In the Netherlands, hospital workers with MRSA are sent home with pay, and are treated with muriopicin nasal drops (MRSA usually lives up your nose). In addition, the workers' family is screened along with any pets, and those that have MRSA are also treated. Because of this program, the Netherlands has kept its MRSA infection rate below one percent (in the U.S., it's roughly 50%).

In *Slate*, there is a very good article about some of hurdles search-and-destroy faces in the U.S. First, some background on MRSA:

https://mikethemadbiologist.com/2006/10/26/mrsa_and_search_and_destroy/

> *In the United States, MRSA kills an estimated 13,000 people every year, which means that a hospital patient is 10 times as likely to die of MRSA as an inmate is to be murdered in prison. The latest survey by the Centers for Disease Control and Prevention found that 64 percent of the* Staphylococcus aureus *strains in American hospitals were MRSA—that is, resistant to the powerful antibiotic methicillin and other antibiotics—which makes them difficult to treat....*
> *Given the dimensions of the threat, you'd think that the CDC would be making a priority of fighting it. After all, federal health agencies have spent billions to fight anthrax (which caused five deaths in 2001), smallpox (last U.S. death: 1949), and pandemic flu (yet to appear in the United States). And there is reason to think that search and destroy works, since health-care authorities abroad have kept rates of antibiotic-resistant bugs in their countries much lower than ours. In Dutch hospitals, the rate of MRSA is less than 1 percent. Canada's rate is 10 percent. And more than 100 studies have shown the effectiveness of search and destroy, including work released in the last month in the United States.*

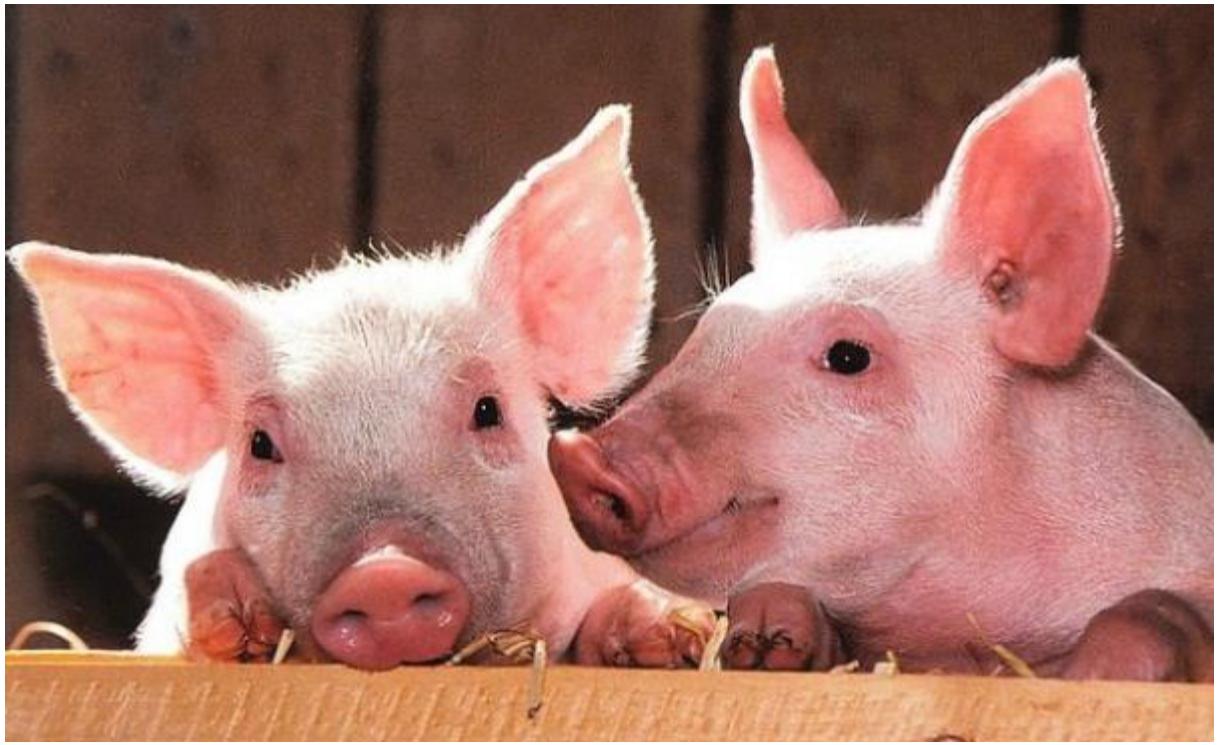
Unfortunately, the CDC, which release new guidelines Oct. 19, hasn't endorsed search and destroy:

> *Yet the CDC refuses to endorse search and destroy. It is sticking to the mantra that hospital workers should wash their hands more carefully and frequently, and that in most cases patients should be isolated only after symptoms of infection with MRSA appear. Routine surveillance to find patients who may not be symptomatic, but are still contagious, is rarely practiced, and not recommended in the CDC's new hospital infection-fighting guidelines, which were released last week after five years of deliberations. The guidelines do not include a routine recommendation for search and destroy.*

The CDC refuses despite evidence to the contrary:

# Can we go back?

# Danish MRSA-infected pigs causing problems throughout Europe



# Pigs as Source of Methicillin-Resistant Staphylococcus aureus CC398 Infections in Humans, Denmark

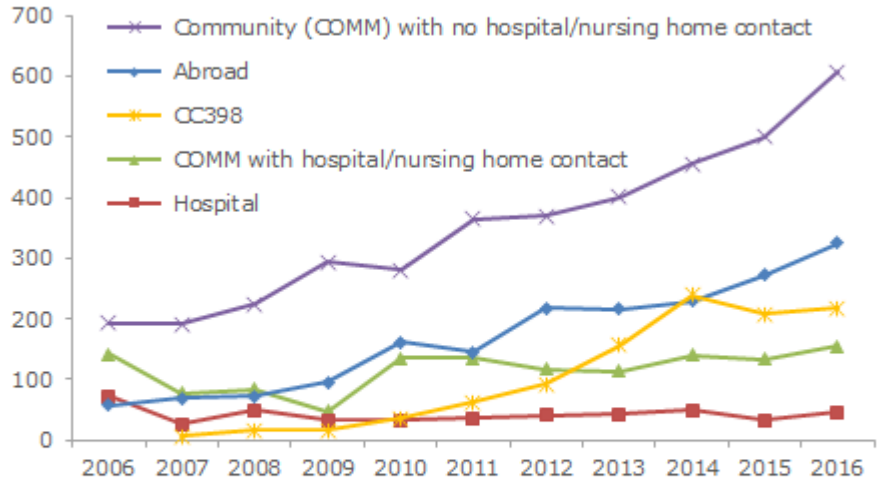
**Abstract**

An emerging subtype of methicillin-resistant *Staphylococcus aureus* (MRSA), clonal complex (CC) 398, is associated with animals, particularly pigs. We conducted a matched case–control and a case–case study comparing 21 CC398 case-patients with 2 controls randomly selected from the Danish Civil Registry and 2 case-patients infected with MRSA other than CC398. On farms of case-patients, animals were examined for MRSA. Thirteen case-patients reported pig exposure. Living or working on farms with animals was an independent risk factor for CC398 in the case–control (matched odds ratio [MOR] 35.4, 95% confidence interval [CI] 2.7–469.8) and the case–case study (MOR 14.5, 95%CI 2.7–76.7). History of hospitalization was associated with an increased risk only in the case–control study (MOR 11.4, 95% CI 1.4–94.8). A total of 23 of 50 pigs on 4 of 5 farms were positive for CC398. Our results, corroborated by microbiologic testing, demonstrate that pigs are a source of CC398 in Denmark.

EID Volume 14, Number 9-September 2008

# EPI-NEWS Denmark MRSA 2016

**Figure 2. Distribution of clinical MRSA infections by epidemiological classification, 2006-2016**




A total of 8 outbreaks counting 56 MRSA cases were identified. The largest outbreak was observed in the Region of Southern Denmark and comprised a total of 36 cases associated with a maternity ward, with a human variant of CC398 (*spa* type t034, *scn* and *pvl* positive). The second-largest outbreak, counting eight cases, started at a residential sports school for young people (*spa* type t148).

http://www.ssi.dk/English/News/EPI-NEWS/2017/No%2023%20-%202017.aspx

INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY JULY 2014, VOL. 35, NO. 7

SHEA/IDSA PRACTICE RECOMMENDATION

# Strategies to Prevent Methicillin-Resistant *Staphylococcus aureus* Transmission and Infection in Acute Care Hospitals: 2014 Update

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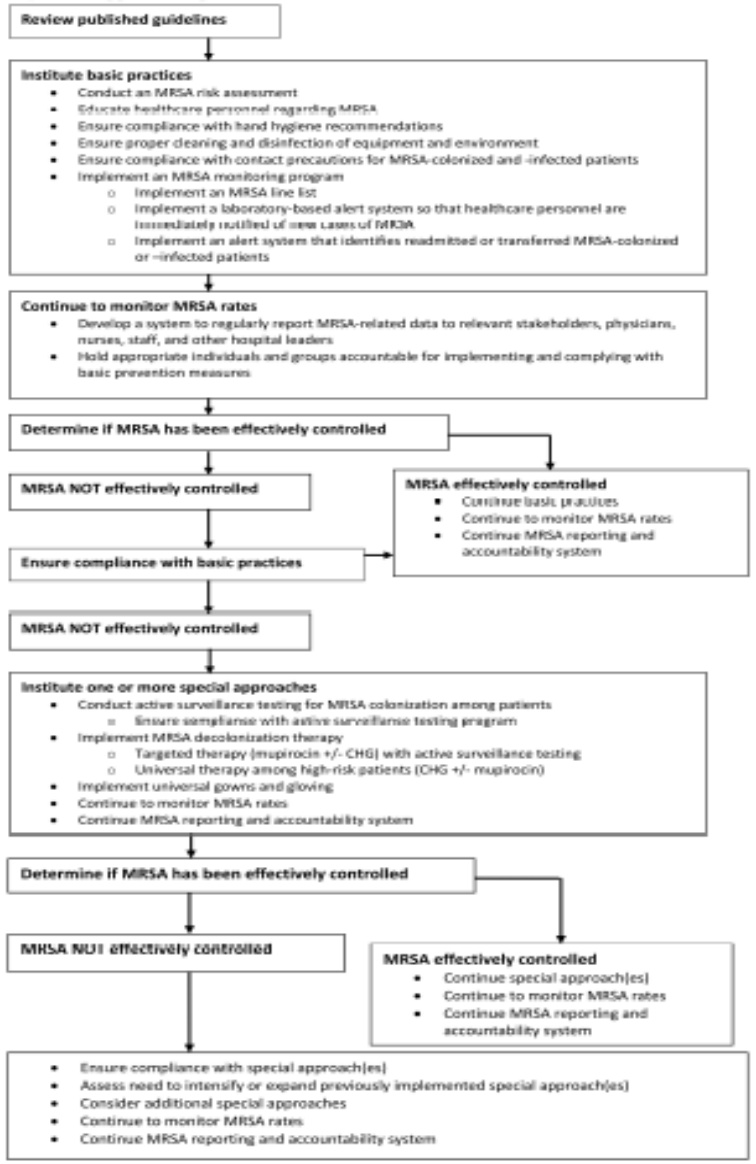
# Discussion in SHEA document

- MRSA HAIs have been associated with significant morbidity and mortality. Although some investigators have found no difference in morbidity and mortality when comparing infections due to methicillin-susceptible *S. aureus* (MSSA) to those due to MRSA, some studies comparing patients with MSSA bacteremia to those with MRSA bacteremia have reported nearly twice the mortality rate, significantly longer hospital stays, and significantly higher median hospital costs for MRSA.

- Compared with patients with an MSSA SSI, one study found that those with an MRSA SSI have a 3.4 times higher risk of death and almost 2 times greater median hospital costs.

# General recommendation

V.A.5.c.i. **In acute-care hospitals**, implement Contact Precautions routinely for all patients infected with target MDROs and for patients that have been previously identified as being colonized with target MDROs (e.g., patients transferred from other units or facilities who are known to be colonized). (11, 38, 68, 114, 151, 183, 188, 204, 217, 242, 304) *Category IB*


Review published guidelines
Institute basic practices
Conduct an MRSA risk assessment
Educate healthcare personnel regarding MRSA
Ensure compliance with hand hygiene recommendations
Ensure proper cleaning and disinfection of equipment and environment
Ensure compliance with contact precautions for MRSA-colonized and -infected patients
Implement an MRSA monitoring program
Implement an MRSA line list
Implement a laboratory-based alert system so that healthcare personnel are immediately notified of new cases of MRSA
Implement an alert system that identifies readmitted or transferred MRSA-colonized or -infected patients
Continue to monitor MRSA rates
Develop a system to regularly report MRSA-related data to relevant stakeholders, physicians, nurses, staff, and other hospital leaders
Hold appropriate individuals and groups accountable for implementing and complying with basic prevention measures
Determine if MRSA has been effectively controlled
MRSA NOT effectively controlled
MRSA effectively controlled
Continue basic practices
Continue to monitor MRSA rates
Continue MRSA reporting and accountability system
Ensure compliance with basic practices
MRSA NOT effectively controlled
Institute one or more special approaches
Conduct active surveillance testing for MRSA colonization among patients
Ensure compliance with active surveillance testing program
Implement MRSA decolonization therapy
Targeted therapy (mupirocin +/- CHG) with active surveillance testing
Universal therapy among high-risk patients (CHG +/- mupirocin)
Implement universal gowns and gloving
Continue to monitor MRSA rates
Continue MRSA reporting and accountability system
Determine if MRSA has been effectively controlled
MRSA NOT effectively controlled
MRSA effectively controlled
Continue special approach(es)
Continue to monitor MRSA rates
Continue MRSA reporting and accountability system
Ensure compliance with special approach(es)
Assess need to intensify or expand previously implemented special approach(es)
Consider additional special approaches
Continue to monitor MRSA rates
Continue MRSA reporting and accountability system

# Adverse effects of contact isolation

**Summary**

Health-care workers are half as likely to enter the rooms of patients in contact isolation, but are more likely to wash their hands after caring for them than after caring for patients not in isolation

Kirkland, K., Weinstein, J. Adverse effects of contact isolation. *The Lancet.* Volume 354, No. 9185. p 1177-1178, 2 October 1999

Is entry less because healthcare providers spend *more time* with the patient while in the patient's room performing a variety of interventions?

Is it not a positive effect to have healthcare providers wash their hands more often when caring for patients in isolation?

# Adverse effects of contact precautions

Increased anxiety and depression – higher Hamilton Depression Rating Scale scores.

Less Self esteem and sense of control

- Study – N 40 two large District General Hospitals and one elderly care hospital.
- Study – N 51 Active patients admitted in isolation for either MRSA or VRE. Control patients admitted for treatment of infection but did not require isolation. Patients taking established doses of benzodiazepines or antidepressants were allowed to participate (isolation group had higher Axis 1 psychiatric diagnosis than control but not found to be significant).

Further study is needed to explore relationship between contact precautions and adverse effects.

Gammon, J, Mphil B., Analysis of the stressful effects of hospitalization and source isolation on coping and psychological constructs. *International Journal of Nursing Practice* 4(2):84-96, June 1998.
Catalono et. al. Anxiety and depression in hospitalized patients in resistant organism isolation *Southern Medical Journal 96(2): 141-5, 2003 Feb.*

# Necessary elements of a Horizontal Approach

**Table 2** Necessary elements for a less restrictive (noncontact precautions) approach for the control of endemic MDROs

- Hospital-wide surveillance for device-associated infections and MDROs
- Robust and sustainable hand hygiene program with routine surveillance and feedback to HCWs, unit management, and senior leadership
- Persistently high hand hygiene compliance in all patient units
- Periodic hand hygiene educational programs to provide ongoing reinforcement
- Evidence-based infection prevention interventions "bundles" for device-associated infections: central venous lines, urinary catheters, and endotracheal intubation/ventilator bundles
- Surveillance for adherence with infection prevention bundles
- Chlorhexidine bathing of patients
- Chlorhexidine gluconate impregnated central line dressings
- Optimal patient-to-nurse ratio and adequate staffing, consistent with accepted and standard practice
- Highly functional disinfection and sterilization program with quality assessment program to ensure and track the adequacy of disinfection over time
- Maximal use of private rooms
- Antimicrobial stewardship program
- Bare below-the-elbows approach to inpatient care
- Evidence-based implementation of infection prevention measures through a comprehensive unit safety program (CUSP)
- Ongoing, robust, hospital-wide surveillance for hospital-associated infections and adverse patient outcomes

Control of Drug-Resistant Pathogens in Endemic Settings: Contact Precautions, Controversies, and a Proposal for a Less Restrictive Alternative. G. Bearman, Stevens, M. Current Infectious Disease Reports. DOI 10.1007/s11908-012-0299-8

# The Impact of Discontinuing Contact Precautions for VRE and MRSA on Device-Associated Infections

Michael B. Edmond, MD, MPH, MPA;[1] Nadia Masroor, BS;[2] Michael P. Stevens, MD, MPH;[2] Janis Ober MSN, RN, CIC;[2] Gonzalo Bearman, MD, MPH[2]

The impact of discontinuing contact precautions for patients with MRSA and VRE colonization/infection on device-associated hospital-acquired infection rates at an academic medical center was investigated in this before-and-after study. In the setting of a strong horizontal infection prevention platform, discontinuation of contact precautions had no impact on device-associated hospital-acquired infection rates.

*Infect. Control Hosp. Epidemiol.* 2015;36(8):978–980

# Taking Off the Gloves: Toward a Less Dogmatic Approach to the Use of Contact Isolation

| | Likelihood of benefit for contact precautions | |
|---|---|---|
| | **Lower** | **Higher** |
| Hand hygiene compliance | High | Low |
| HAI rates | Low | High |
| Organism treatability | Easy to treat | Difficult to treat |
| Organism prevalence | Common | Rare |
| Source patient | Asymptomatic | Open wound, diarrhea, uncontained secretions |
| Patients at risk | Healthy | Vulnerable due to age, immune status, invasive devices |
| Physical environment | Clean, spacious, single room | Crowded, dirty wards |
| Available resources | Limited | Plentiful |

Kirkland, K., Weinstein, R. CID Volume 48, Issue 6, 15 March 2009, Pages 766-771

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*

Group 1 MRSA screening and isolation

Group 2 targeted decolonization ( i.e., screening, isolation, and decolonization of MRSA carriers)

Group 3 universal decolonization (i.e., no screening, and decolonization of all patients. Contact precautions were similar to those in group 1). Decolonization – intranasal mupirocin twice a day, daily CHG bathing

**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.)

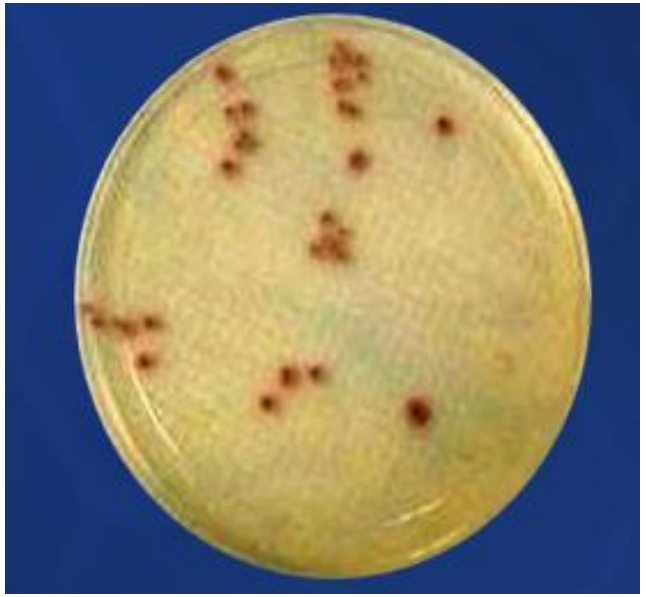
"This obviated the need for surveillance testing, and *reduced* contact isolation."

# When to discontinue Contact Precautions?

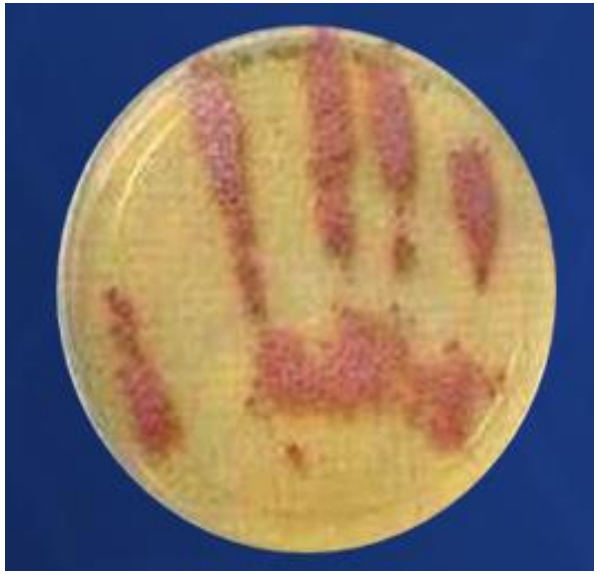
- Establish institutional criteria for discontinuation of contact precautions.
  - A single negative surveillance test may not adequately detect persistence of MRSA colonization. A reasonable approach to subsequent discontinuation would be to document clearance of the organism with 3 or more surveillance tests in the absence of antimicrobial exposure. When to consider retesting MRSA patients to document clearance is debatable, but waiting at least a few months (eg, 4–6 months) since the last positive test is often advised. Some hospitals may choose to consider MRSA-colonized patients to be colonized indefinitely.

Infection control and hospital epidemiology july 2014, vol. 35, no. 7

# How good is your hand hygiene program?



Acquisition of MRSA on hands after touching the bedrail of a colonized patient.



Acquisition of MRSA on hands after examination of a colonized patient.

# Risk of Methicillin-Resistant Staphylococcus aureus Infection after Previous Infection or Colonization

18 month follow-up 209 adult patients newly identified MRSA +

- 29% (60 patients) developed subsequent MRSA infections (90 infections). The infections were identified:
  - 28% involved bacteremia
  - 56% involved pneumonia, soft tissue infection, osteomyelitis, or septic arthritis
- 80% of patients with subsequent MRSA infections developed the infection at a new site.
  - 49% of new MRSA infections were diagnosed after discharge from the hospital.
- Subsequent MRSA infection did not differ significantly according to discharge disposition (home, rehab, snf).

Huang, S., Platt, R. MRSA Reinfection, *CID* 2003:36 (1 February)

# Risk of Post-discharge Infection with Vancomycin-Resistant *Enterococcus* after Initial Infection or Colonization

8% risk of infection within 18 months after detection. More than one-third of infections occurred after discharge.

In multivariate analysis, only hematologic malignancy was significantly associated with VRE infection [OR 9.1 {95% CI, 1.4-60.4].

Risk of later infection relatively low, the risk of bacteremia when infection occurred, was high (30%).

- Post-discharge infections were often severe, with 20% involving bacteremia and 30% resulting in readmission.

Datta, R., Huang, S., *Infect Control Hosp Epidemiol* 2010;31(12):1290-1293

# Control of Vancomycin-Resistant Enterococcus in Health Care Facilities in a Region

Siouxland Region includes facilities in Iowa, Nebraska, and South Dakota

- Sudden increase in VRE – established a taskforce which included public health workers, personnel from acute care and long-term care facilities.
- Overall prevalence of VRE at 30 facilities that participated in all three years (1997, 1998 and 1999) decreased from 2.2 percent in 1997 to 0.5 percent in 1999
  p value < 0.001
- Surveillance cultures for VRE and isolation of infected patients can reduce/eliminate transmission of VRE in healthcare facilities in a region.

Ostrowsky, B., et al. *N Engl J Med*, Vol. 344, No. 19 May 10, 2001

“In our highly Inter-connected Healthcare System, we can no longer go it alone”

James A. McKinnell, M.D.
LA-Biomed at Harbor UCLA Medical Center
LA County Department of Public Health

# MRSA patient story

link


*"The names of the patients whose lives we save can never be known. Our contribution will be what did not happen to them. And, though they are unknown, we will know that mothers and fathers are at graduations and weddings they would have missed, and that grandchildren will know grandparents they might never have known, and holidays will be taken, and work completed, and books read, and symphonies heard, and gardens tended that, without our work, would never have been."*

*Donald M. Berwick, MD, MPP, President Emeritus, Institute for Healthcare Improvement*

# Caution

Does your program have high levels of hand hygiene, chlorhexidine bathing and decolonization of your patients?

# Controversies in Infection Prevention
# To Isolate or Not?
# That is the Question!

## MRSA AND VRE
## INFECTION AND COLONIZATION

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Amy Nichols, RN, MBA, CIC, FAPIC
Director, Hospital Epidemiology and Infection Control
University of California San Francisco Health
*No financial disclosures*

# Objectives

At the end of this presentation, the participant will be able to:

1. Cite three sources for supporting a recommendation for discontinuing Contact Isolation for patients colonized or infected with MRSA or VRE

2. Refer to UCSF Health data demonstrating non-inferior patient outcomes with standard precautions employed to care for patients colonized or infected with MRSA or VRE

3. Articulate three metrics to support their recommendation to administration for discontinuing Contact Isolation for patients colonized or infected with MRSA or VRE

# What Is Isolation?

Single-occupancy room

Personal protective equipment (masks, gowns, gloves)

Hand hygiene emphasis

Decontamination using detergents/disinfectants

Restrictions on visitors

Gammon J Clin Nurs 1999

# Literature Review

2007 CDC Isolation Guidelines

| | | | |
|---|---|---|---|
| Multidrug-resistant organisms (MDROs), infection or colonization (e.g., MRSA, VRE, VISA/VRSA, ESBLs, resistant *S. pneumoniae*) | Contact + Standard | | MDROs judged by the infection control program, based on local, state, regional, or national recommendations, to be of clinical and epidemiologic significance. Contact Precautions recommended in settings with evidence of ongoing transmission, acute care settings with increased risk for transmission or wounds that cannot be contained by dressings. See recommendations for management options in Management of Multidrug-Resistant Organisms In Healthcare Settings, 2006 (https://www.cdc.gov/infectioncontrol/guidelines/mdro/) [870]. Contact state health department for guidance regarding new or emerging MDRO. |

# Literature Review

Effectiveness of wearing gowns and gloves to prevent hospital-based transmission of pathogens is unproven.

Widespread use of gowns/gloves decreases frequency and duration of visits from healthcare workers and patients

Handwashing is routinely performed on exit only

Cost of gowns/gloves = $1627/isolated pt (ALOS 46 days, $2390 in 2017 dollars)

Kirkland 1999 Lancet

# MDROs are Bad Bugs

**Table 2.** Unadjusted clinical and financial outcomes[a] of 150 patients with methicillin-resistant *Staphylococcus aureus* surgical site infections (SSI) compared with 231 uninfected controls and 128 patients with methicillin-susceptible *S. aureus* SSI.

| | MRSA SSI N = 150 n (%) | Uninfected Controls N = 231 n (%) | Unadjusted Odds Ratio [95% CI]; p-value | MSSA SSI N = 128 n (%) | Unadjusted Odds Ratio [95% CI]; p-value |
|---|---|---|---|---|---|
| Died during admission | 5 (3.5) | 2 (0.9) | 4.69 [0.88–25.1]; 0.08 | 1 (0.8) | 4.31 [0.50–37.4]; 0.15 |
| Discharged to[b]: | | | | | <0.0001 |
| Home | 90 (65.7) | 175 (78.5) | 0.33 [0.17–0.63]; 0.0005 | 92 (78.0) | 0.54 [0.31–0.95]; 0.03 |
| Facility | 47 (34.3) | 48 (21.5) | 3.06 [1.59–5.84]; 0.0005 | 26 (22.0) | 2.05 [1.16–3.62]; 0.01 |
| *Outcomes within 90-days of procedure* | | | | | |
| Readmitted within 90 days within of procedure [b] | 110 (77.5) | 23 (10.2) | 30.2 [16.8–54.1]; <0.0001 | 108 (87.1) | 0.51 [0.26–0.98]; 0.04 |
| Dead within 90 days of procedure | 25 (16.7) | 7 (3.0) | 7.20 [2.86–18.1]; <0.0001 | 9 (7.0) | 2.64 [1.19–5.90]; 0.01 |
| Total post-procedure length of hospitalization (days) – median (IQR) | 21 (10–32) | 5 (3–7) | <0.0001 | 15 (7–22) | 0.003 |
| Hospital charges – median (IQR)[c] | 79,029 (38,113–127,846) | 38,735 (17,753–60,627) | <0.0001 | 55,667 (22,201–86,757) | 0.001 |

[a]P values calculated using Student t test or Wilcoxon rank sum test for continuous variables. P-values, odds ratios, and 95% confidence intervals for categorical variables were calculated using the Cochran-Mantel-Haenszel test (MRSA SSI v. matched-uninfected controls) and the Fisher exact test or chi-square (MRSA SSI v MSSA SSI). All percentages were calculated using denominators that excluded missing data.
[b]Denominator includes patients who survived their index admissions.
[c]Financial data were available for 144 cases (96%), 202 (87%) uninfected controls, and 127 (99%) MSSA SSI controls.
doi:10.1371/journal.pone.0008305.t002

2009 Anderson et al. MRSA SSI Outcomes

# MDROs are Bad Bugs

Table 2. Epidemiology of Health Care–Associated Infections Among US Adult Inpatients (Including ICUs) at Acute Care Hospitals, 2009[a]

| Health Care-Associated Infection Type | Incidence Rate | Population at Risk | Cumulative Incidence |
|---|---|---|---|
| Surgical site infections | 1.98[b] | 8 020 658 | 158 639 |
| MRSA | 0.29[b] | 8 020 658 | 23 417 |
| Central line–associated bloodstream infections | 1.27[c] | 31 695 922 | 40 411 |
| MRSA | 0.21[c] | 31 695 922 | 6638 |
| Catheter-associated urinary tract infections | 1.87[c] | 41 115 000 | 77 079 |
| Ventilator-associated pneumonia | 1.33[c] | 23 392 785 | 31 130 |
| *Clostridium difficile* infections | 3.85[d] | 34 716 079 | 133 657 |
| Total health care–associated infections | NA | NA | 440 916 |

Abbreviations: ICU, intensive care unit; MRSA, methicillin-resistant *Staphylococcus aureus*; NA, not applicable.

[a] Estimates based on data from National Healthcare Safety Network (2009) and National Inpatient Sample (2009). Incidence rate for *Clostridium difficile* infections based on systematic review of literature.

[b] Incidence rate in cases per 100 patient procedures; population at risk in total patient procedures.

[c] Incidence rate in cases per 1000 device-days; population at risk in total device-days.

[d] Incidence rate in cases per 1000 patient-days; population at risk in total patient-days.

Zimlichman 2013 JAMA Int Med

# Literature Review

2008 Institute for Healthcare Improvement How-To Guide for Reducing MRSA:

**The Case for Reducing Methicillin-Resistant *S. aureus* Infection**

Health care-associated infections remain a major cause of morbidity, mortality, and excess health care cost despite concerted infection control efforts over nearly a half-century. Recently, treatment of these infections has become more complex due to an alarming rise in antibiotic resistance. Infections caused by methicillin-resistant *S. aureus* (MRSA) are particularly problematic: their incidence has increased inexorably over the past decade, and, compared to methicillin-susceptible staphylococcal infections, they are more lethal.

http://www.ihi.org/resources/Pages/Tools/HowtoGuideReduceMRSAInfection.aspx

# Literature Review

2008 Institute for Healthcare Improvement  How-To Guide for Reducing MRSA:

The very rapid emergence of community-acquired MRSA (CA-MRSA) in patients with no prior exposure to health care institutions or other risk factors poses a serious new challenge to the nation's hospitals.  Patients with CA-MRSA are presenting to hospital emergency departments and outpatient clinics in increasing numbers, and in-hospital spread has been documented following their admission.

http://www.ihi.org/resources/Pages/Tools/HowtoGuideReduceMRSAInfection.aspx

# Literature Review

2008 Institute for Healthcare Improvement  How-To Guide for Reducing MRSA

The human and impact of MRSA is high*:

368,600 hospital stays in 2005 were from MRSA infection, an increase by 30% from 2004 and 10-fold since 1995.

In-hospital mortality for patients with MRSA in 2004 was 4.7%, more than double than for patients without MRSA (2.1%)

10-day length of stay vs. 4.6 days for all other stays

Cost of hospital stays for MRSA infections on average was $14,000 vs. average of $7,600 for all other stays

http://www.ihi.org/resources/Pages/Tools/HowtoGuideReduceMRSAInfection.aspx

# Pay for Preventing (Not Causing) Health Care–Associated Infections

Mitchell H. Katz, MD

**The reason to prevent** health care–associated infections is to save lives, not costs. Readers might wonder then why we thought it was important to publish a systematic review of the costs of health care–associated infections.

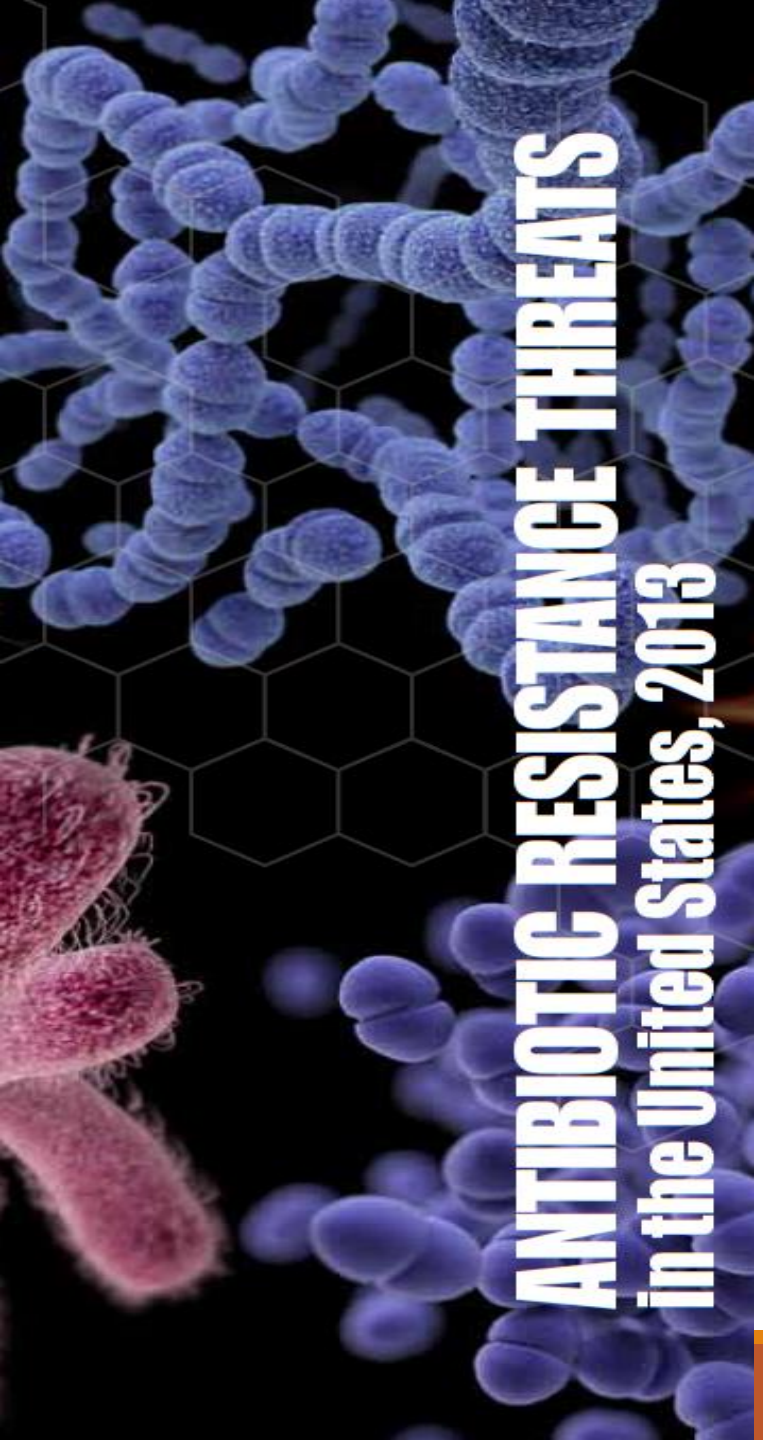
The answer is that the editors believe that the extraordinary costs of these infections—an estimated $10 billion a year in the United States—will motivate health care administrators to invest in the necessary systems to decrease these infections. The costs of these investments are not trivial. Information technology systems to monitor infection rates (successful quality improvement projects require knowledge of baseline rates of infection and infection following interventions); dedicated time to educate clinicians; supplementary assessments of patients for need of lines, catheters, or ventilator support; and preventive measures (eg, chlorhexidine baths, oral care with antiseptic solution) are costly. This study, however, will enable hospital administrators to better prioritize their spending by allowing them to compare the costs of interventions with the savings accrued by avoiding infections.

Related article page 2039

In the past, one of the challenges in motivating system change through demonstrating the costs of health care–associated infections was that insurers paid hospitals for the additional costs owing to the infection. Under this perverse payment scheme, a hospital that invested money to decrease infections would pay "twice": once for the intervention and once through not getting the additional money for treating the patient for the additional complication. This began to change in 2009 when Medicare stopped paying for hospital-acquired infections.

Not paying for hospital-acquired infections or errors is an important part of the movement toward paying for quality, not quantity, of care. As physicians, we should embrace the opportunity that these new payment schemes offer for bringing higher-quality care—including fewer infections—to our patients.

Zimlichman 2013 JAMA Int Med




https://www.cdc.gov/drugresistance/pdf/ar-threats-2013-508.pdf

## Urgent Threats

- *Clostridium difficile*
- Carbapenem-resistant Enterobacteriaceae (CRE)
- Drug-resistant *Neisseria gonorrhoeae*

## Serious Threats

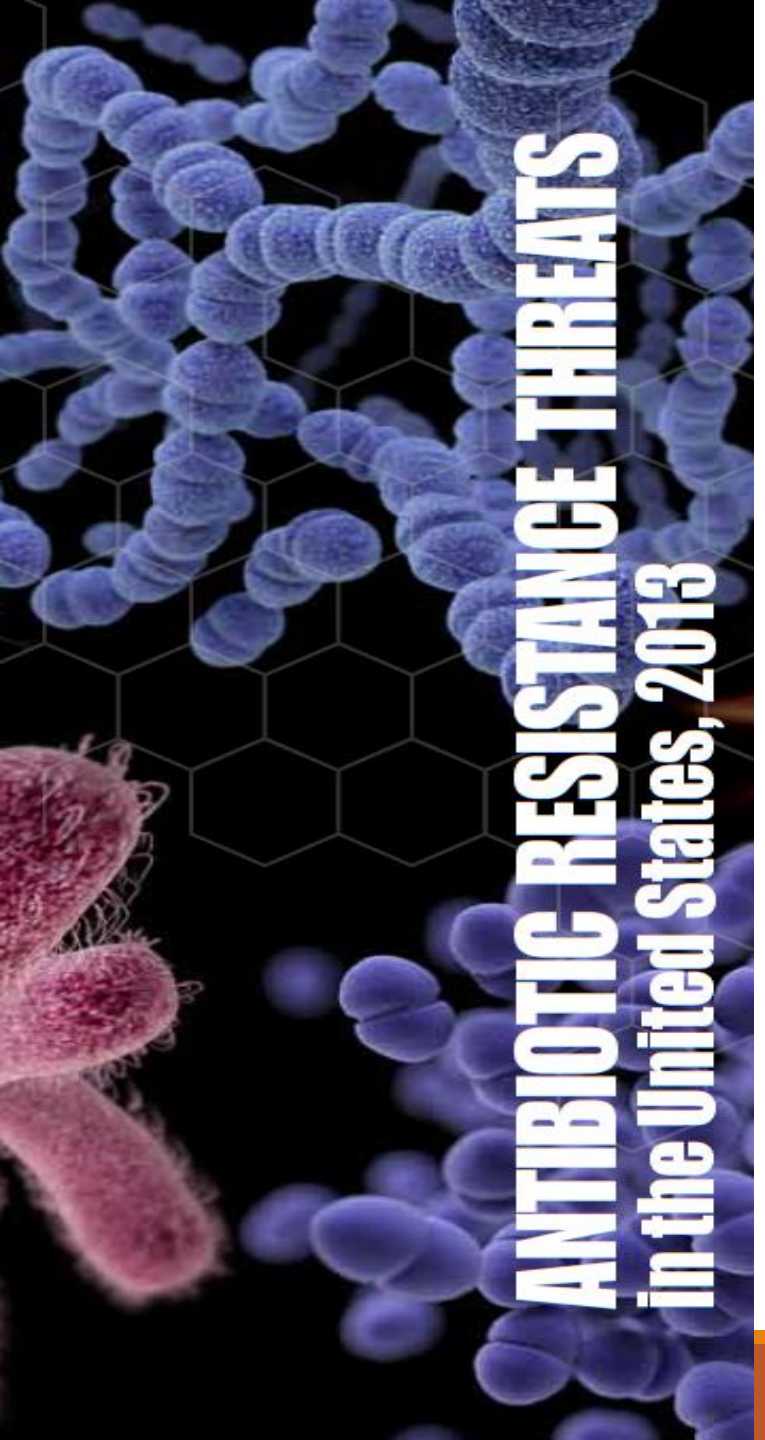
- Multidrug-resistant *Acinetobacter*
- Drug-resistant *Campylobacter*
- Fluconazole-resistant *Candida* (a fungus)
- Extended spectrum β-lactamase producing Enterobacteriaceae (ESBLs)
- Vancomycin-resistant *Enterococcus* (VRE)
- Multidrug-resistant *Pseudomonas aeruginosa*
- Drug-resistant Non-typhoidal *Salmonella*
- Drug-resistant *Salmonella* Typhi
- Drug-resistant *Shigella*
- Methicillin-resistant *Staphylococcus aureus* (MRSA)
- Drug-resistant *Streptococcus pneumoniae*
- Drug-resistant tuberculosis

## Concerning Threats

- Vancomycin-resistant *Staphylococcus aureus* (VRSA)
- Erythromycin-resistant Group A *Streptococcus*
- Clindamycin-resistant Group B *Streptococcus*

HAZARD LEVEL
**SERIOUS**

These are significant antibiotic-resistant threats. For varying reasons (e.g., low or declining domestic incidence or reasonable availability of therapeutic agents), they are not considered urgent, but these threats will worsen and may become urgent without ongoing public health monitoring and prevention activities.



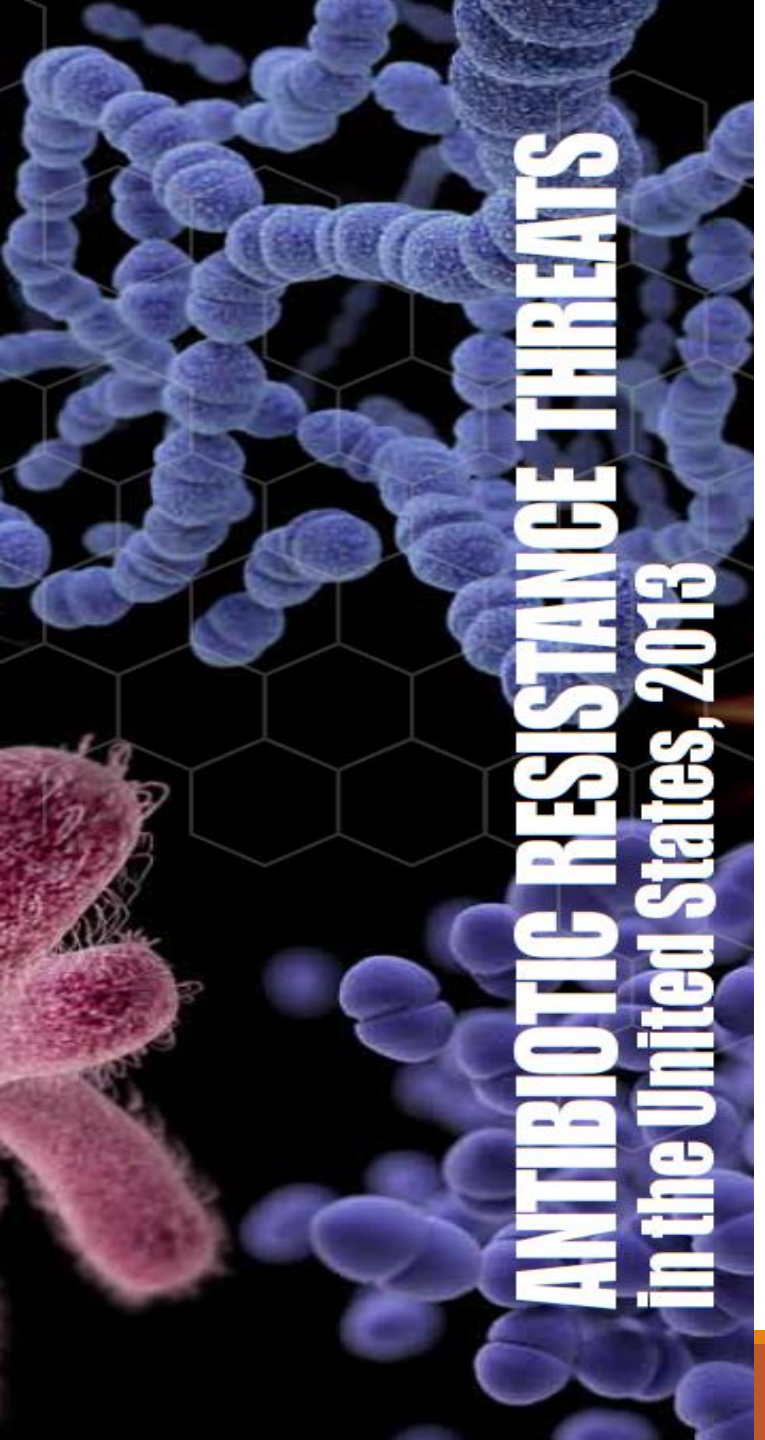

https://www.cdc.gov/drugresistance/pdf/ar-threats-2013-508.pdf

# Developing Resistance

## Timeline of Key Antibiotic Resistance Events

Dates are based upon early reports of resistance in the literature. In the case of pan drug-resistant (PDR)-*Acinetobacter* and *Pseudomonas*, the date is based upon reports of healthcare transmission or outbreaks. Note: penicillin was in limited use prior to widespread population usage in 1943.

| ANTIBIOTIC RESISTANCE INDENTIFIED | | ANTIBIOTIC INTRODUCED | |
|---|---|---|---|
| penicillin-R *Staphylococcus* | 1940 | | |
| | | 1943 | penicillin |
| | | 1950 | tetracycline |
| | | 1953 | erythromycin |
| tetracycline-R *Shigella* | 1959 | | |
| | | 1960 | methicillin |
| methicillin-R *Staphylococcus* | 1962 | | |
| penicillin-R pneumococcus | 1965 | | |
| | | 1967 | gentamicin |
| erythromycin-R *Streptococcus* | 1968 | | |
| | | 1972 | vancomycin |
| gentamicin-R *Enterococcus* | 1979 | | |
| | | 1985 | imipenem and ceftazidime |
| ceftazidime-R Enterobacteriaceae | 1987 | | |
| vancomycin-R *Enterococcus* | 1988 | | |
| levofloxacin-R pneumococcus | 1996 | 1996 | levofloxacin |
| imipenem-R Enterobacteriaceae | 1998 | | |
| XDR tuberculosis | 2000 | 2000 | linezolid |
| linezolid-R *Staphylococcus* | 2001 | | |
| vancomycin-R *Staphylococcus* | 2002 | | |
| | | 2003 | daptomycin |
| PDR-*Acinetobacter and Pseudomonas* | 2004/5 | | |
| ceftriaxone-R *Neisseria gonorrhoeae* PDR-Enterobacteriaceae | 2009 | | |
| | | 2010 | ceftaroline |
| ceftaroline-R *Staphylococcus* | 2011 | | |




https://www.cdc.gov/drugresistance/pdf/ar-threats-2013-508.pdf

# FIGHTING BACK AGAINST ANTIBIOTIC RESISTANCE

## Four Core Actions to Prevent Antibiotic Resistance

### 1 PREVENTING INFECTIONS, PREVENTING THE SPREAD OF RESISTANCE

Avoiding infections in the first place reduces the amount of antibiotics that have to be used and reduces the likelihood that resistance will develop during therapy. There are many ways that drug-resistant infections can be prevented: immunization, safe food preparation, handwashing, and using antibiotics as directed and only when necessary. In addition, preventing infections also prevents the spread of resistant bacteria.

### 2 TRACKING

CDC gathers data on antibiotic-resistant infections, causes of infections and whether there are particular reasons (risk factors) that caused some people to get a resistant infection. With that information, experts can develop specific strategies to prevent those infections and prevent the resistant bacteria from spreading.

### 3 IMPROVING ANTIBIOTIC PRESCRIBING/STEWARDSHIP

Perhaps the single most important action needed to greatly slow down the development and spread of antibiotic-resistant infections is to change the way antibiotics are used. Up to half of antibiotic use in humans and much of antibiotic use in animals is unnecessary and inappropriate and makes everyone less safe. Stopping even some of the inappropriate and unnecessary use of antibiotics in people and animals would help greatly in slowing down the spread of resistant bacteria. This commitment to always use antibiotics appropriately and safely—only when they are needed to treat disease, and to choose the right antibiotics and to administer them in the right way in every case—is known as antibiotic stewardship.

### 4 DEVELOPING NEW DRUGS AND DIAGNOSTIC TESTS

Because antibiotic resistance occurs as part of a natural process in which bacteria evolve, it can be slowed but not stopped. Therefore, we will always need new antibiotics to keep up with resistant bacteria as well as new diagnostic tests to track the development of resistance.

# Literature Review

Duration of colonization:

- MRSA: >1 year (Sanford  CID 1994)
  - Infections ≤18 months post-hospitalization (Huang 2003 CID)
- VRE: >12 months, up to 3 years in patients with malignancy (Byers ICHE 2002)


STOP
HAZARDOU
WASTE
FEDERAL LAW PROHIBITS
ONS

# Adverse Outcomes Associated with Contact Precautions

Reduced patient-healthcare worker contact

- Attending MD half as likely to examine pts on CP
- In-room contact time=22% of non-isolated pts

Longer waits for transfers (10.9 d vs 4.3 d)

Absolute and LOS-adjusted studies of adverse events:

- 31 (CP) vs 15 (non-CP) events/1000 pt days ($p<.001$)
  - Preventable=20 vs 3/1000 pt days
  - Non-preventable = 11 vs 12/1000 pt days

Morgan AJIC 2009

# Adverse Outcomes Associated with Contact Precautions

Process of care measures declined CP vs non-CP

- Inappropriate documentation of VS
- Days without MD or RN note
- Stress testing, LVF testing in CHF pts

Patient Satisfaction

- Significantly higher formal complaint rate (8 vs 1, $p<0.001$)
- Less likely to recommend hospital to a friend
- Inadequuate eplanation of instructions, side effects
- Increased anger, depression

Morgan AJIC 2009

# Psychological Consequences

Sensory deprivation, social isolation
- Hallucinations, noncompliant behavior, increased somnolence, confusion, restlessness, anxiety, boredom, loneliness

Difficulty with directed thinking
- Concentration, negative emotional reactions, paranoid-like delusions

Similar to “ICU Syndrome”
- Disorientation, despair, fear, anger, nightmares
- Defects in memory, attention, concentration
- Helplessness, listlessness, apathy

Pediatric studies
- Aloneness, pain, loss

Loss of control and dignity
- Distress, anxiety, depression, stigma
- Prisoner

Gammon J Clin Nurs 1999

# Psychological Consequences

Limited physical space

Physical barriers impeding social contact

No contact with other patients

Impaired assessment of the passing of time

Lack of control over daily activities

Verbatim interview responses from patients in Contact Isolation for communicable diseases

Isolation is the leper syndrome…the social isolation enhances the physical isolation…cleaners do not clean adequately because they are afraid of catching the disease…the overall standard of care is poor from doctors to cleaners, there are always excuses, excuses, excuses as to why staff cannot stay…no one cares about the isolated patient, after all isolation is for the protection of other staff, patients and staff…there are many barriers to effective communication these include the physical barriers of masks and gowns… The lack of stimulation due to a stagnant environment creates a state of frustration and boredom…fresh air and the very basic things that one has always taken for granted suddenly become very desirable… (Bennet, 1983; p. 37)

Patient 2 said:

There are hostile feelings about hospital staff and care given about the lack of privacy and personal space. The feeling that in isolation one takes on a non-human form and staff are routinely pleasant. The routine is boring and monotonous…the lack of stimulation from staff and visitors is almost intolerable, friends and family often become reluctant to visit. (Bennet, 1983; p. 44)

Gammon J Clin Nurs 1999

# Hand Hygiene and HCP Visits

**Table 3. Average Hand-Hygiene Compliance and Health Care Worker Visits per Hour**

| | Intensive Care Units | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | Intervention | | | Control | | | | |
| | No. of Events | No. of Observations[a] | Mean (95% CI), %[b] | No. of Events | No. of Observations[a] | Mean (95% CI), %[b] | Mean Difference (95% CI), %[c] | *P* Value[d] |
| Hand-hygiene compliance, % | | | | | | | | |
| Room entry | 1563 | 2828 | 56.1 (47.2 to 66.7) | 1644 | 3231 | 50.2 (41.4 to 60.9) | 5.91 (−6.91 to 18.7) | .42 |
| Room exit | 2027 | 2649 | 78.3 (72.1 to 85.0) | 2080 | 3266 | 62.9 (54.4 to 72.8) | 15.4 (8.99 to 21.8) | .02 |
| Health care–worker visits | 3213 | 756.5 | 4.28 (3.95 to 4.64) | 3775 | 716.5 | 5.24 (4.46 to 6.16)[e] | −0.96 (−1.71 to −0.21) | .02 |

[a] Observed entries and observed exits for hand-hygiene compliance, number of hours of observation for health care worker visits.

[b] Percent for hand-hygiene compliance, per hour of observation for health care worker visits.

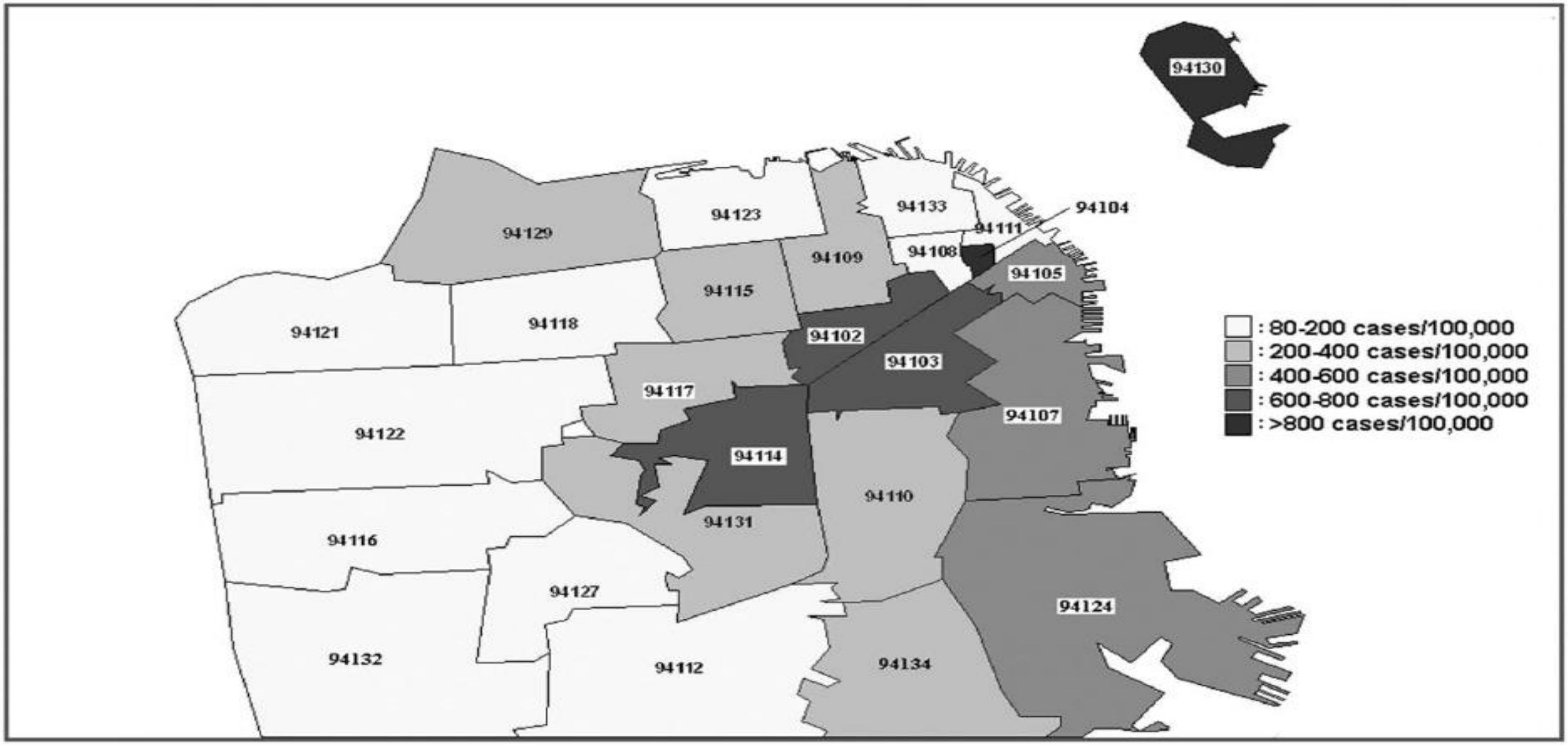
[c] Absolute difference (intervention intensive care units [ICUs] −control ICUs).

[d] From weighted paired *t* test on the log scale with 9 degrees of freedom.

[e] In control ICUs, those patients on contact precautions had 4.78 mean visits per hour from health care workers.

Harris et al JAMA 2013

# But What is the Real Problem?



# Does CP Prevent Transmission?

10 NICUs,  PICUs

- 95% reported compliance with admission screening
- MRSA prevalence
  - 2008:  4.2 (89/2101)
  - 2013:  5.7% (36/62)
- No difference in MRSA acquisition

Lyles 2015 J Ped Inf Dis Soc

# Does CP Prevent Transmission?

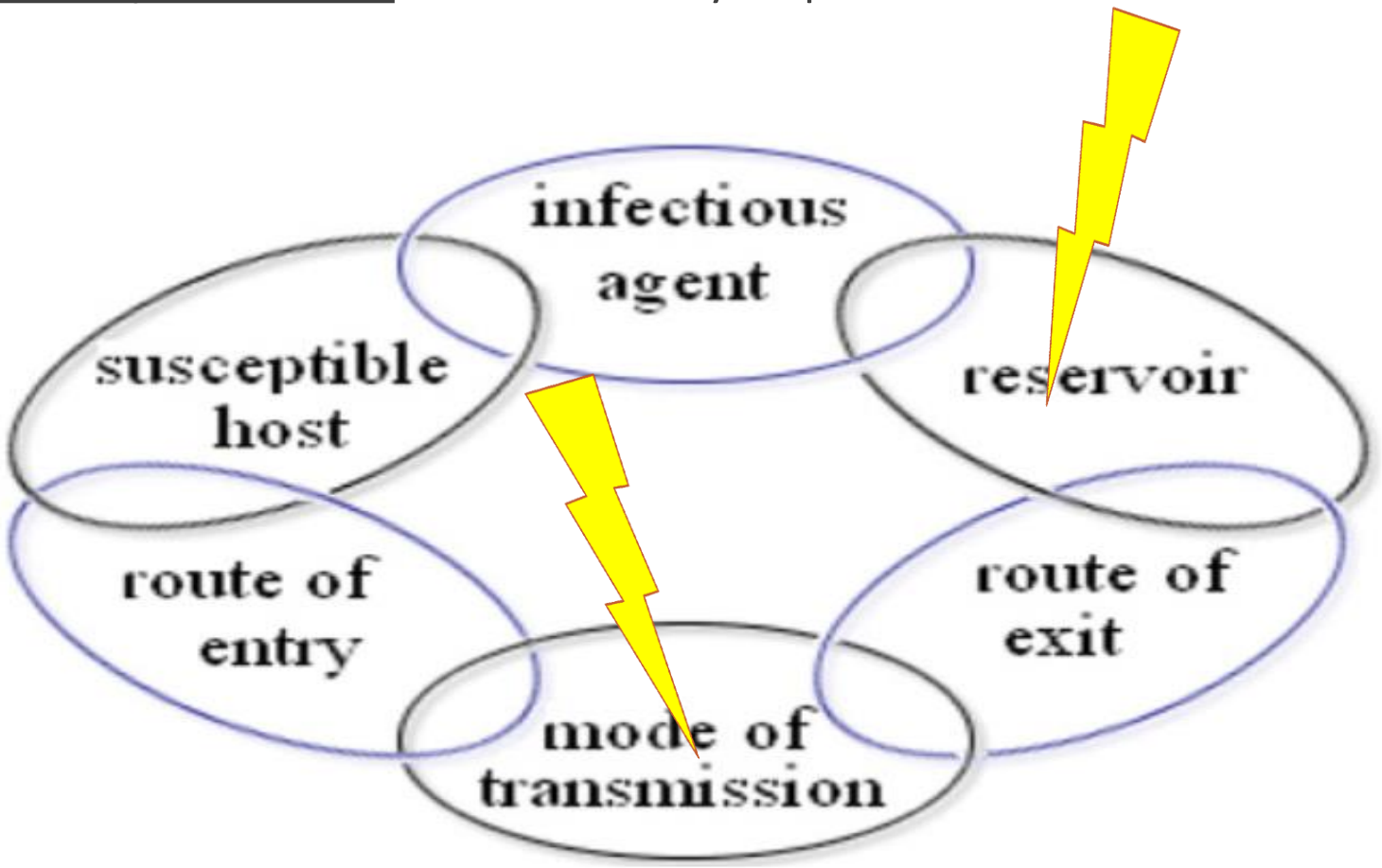
## Conclusion

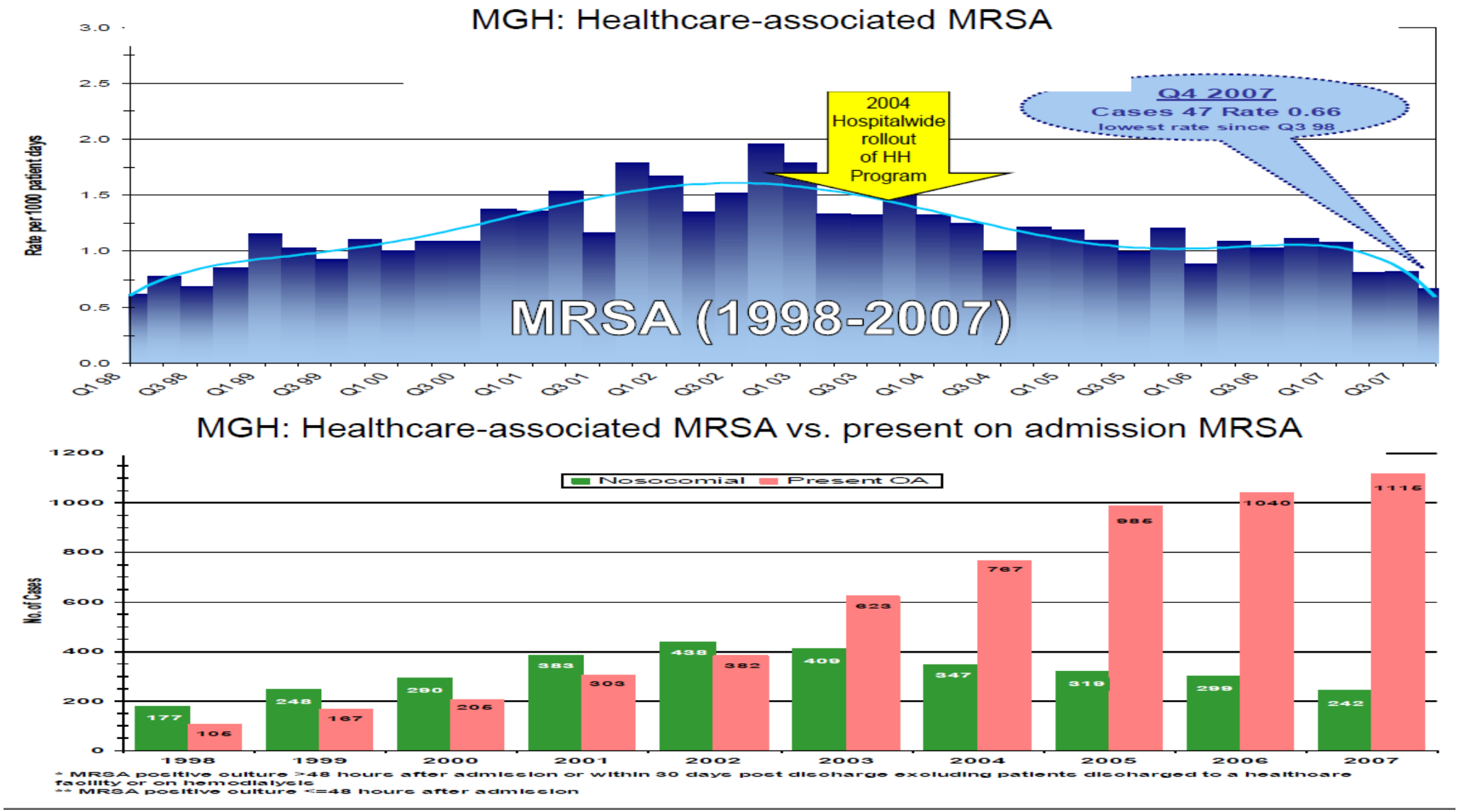
The use of gloves and gowns for all patient contact compared with usual care among patients in medical and surgical ICUs did not result in a difference in the primary outcome of acquisition of MRSA or VRE. Although there was a lower risk of MRSA acquisition alone and no difference in adverse events, these secondary outcomes require replication before reaching definitive conclusions.

Harris et al JAMA 2013

# Renewed Emphasis on an Old Concept

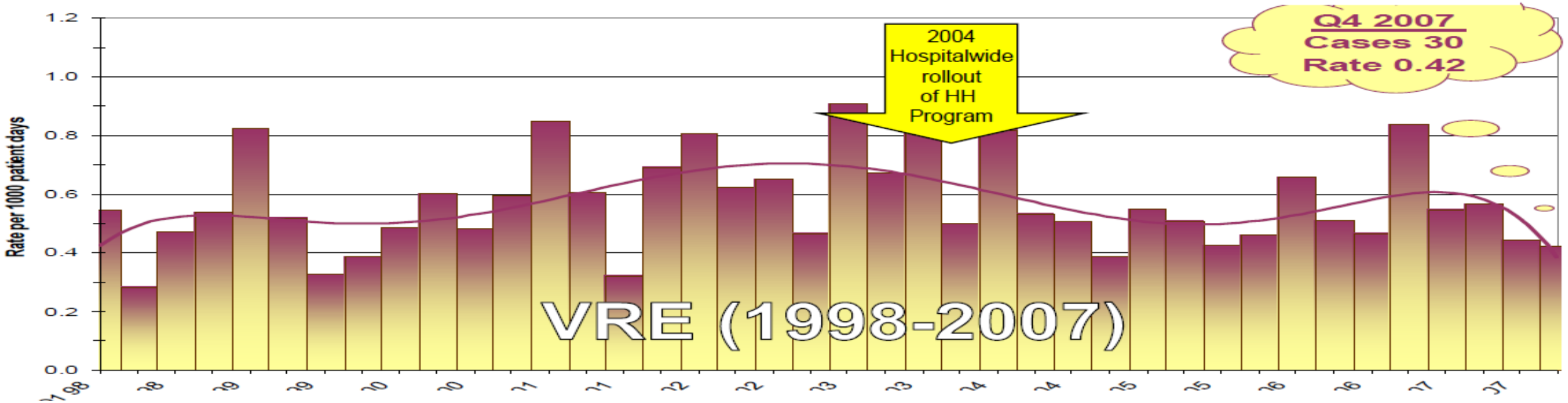
STANDARD PRECAUTIONS *used correctly at all times* will successfully stop most disease transmission.



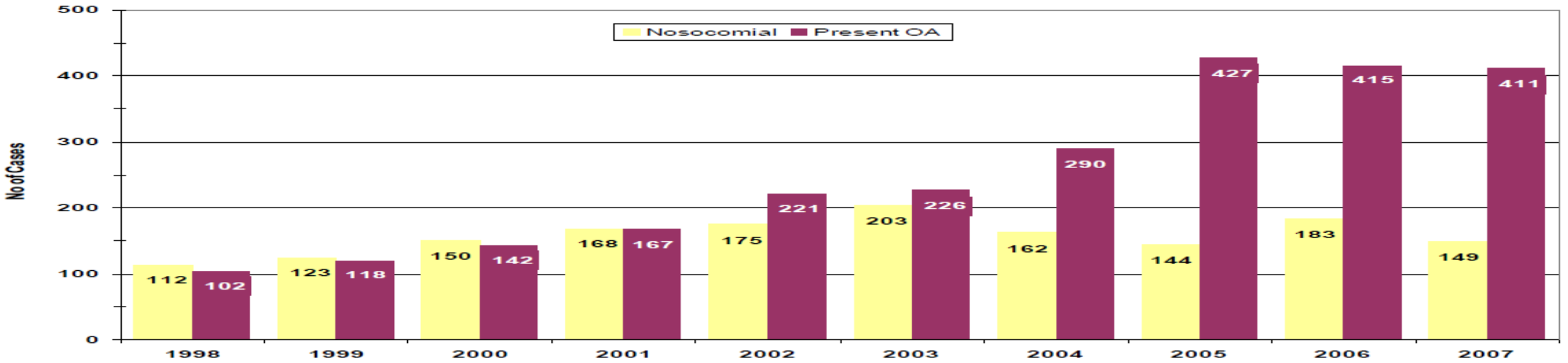



Cohen 2008 ICHE

# MGH: Healthcare-associated VRE



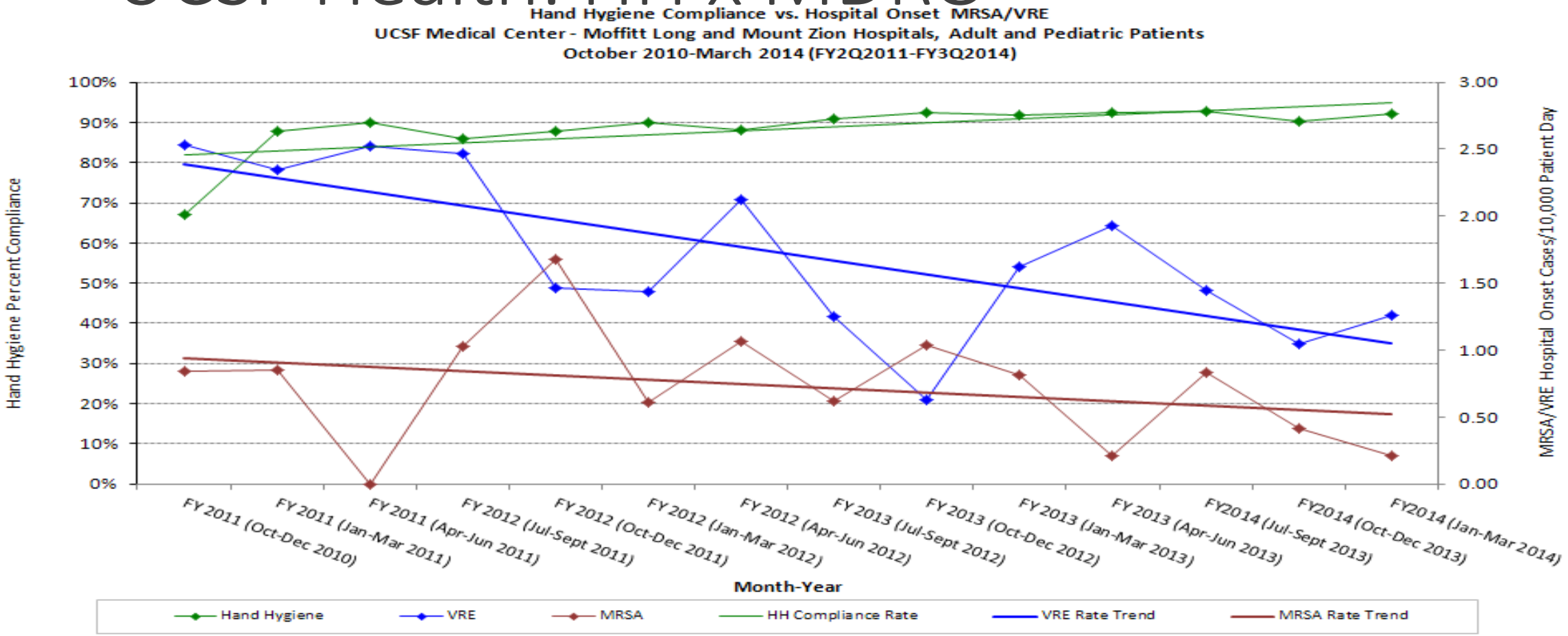

# MGH: Healthcare-associated VRE vs. present on admission VRE



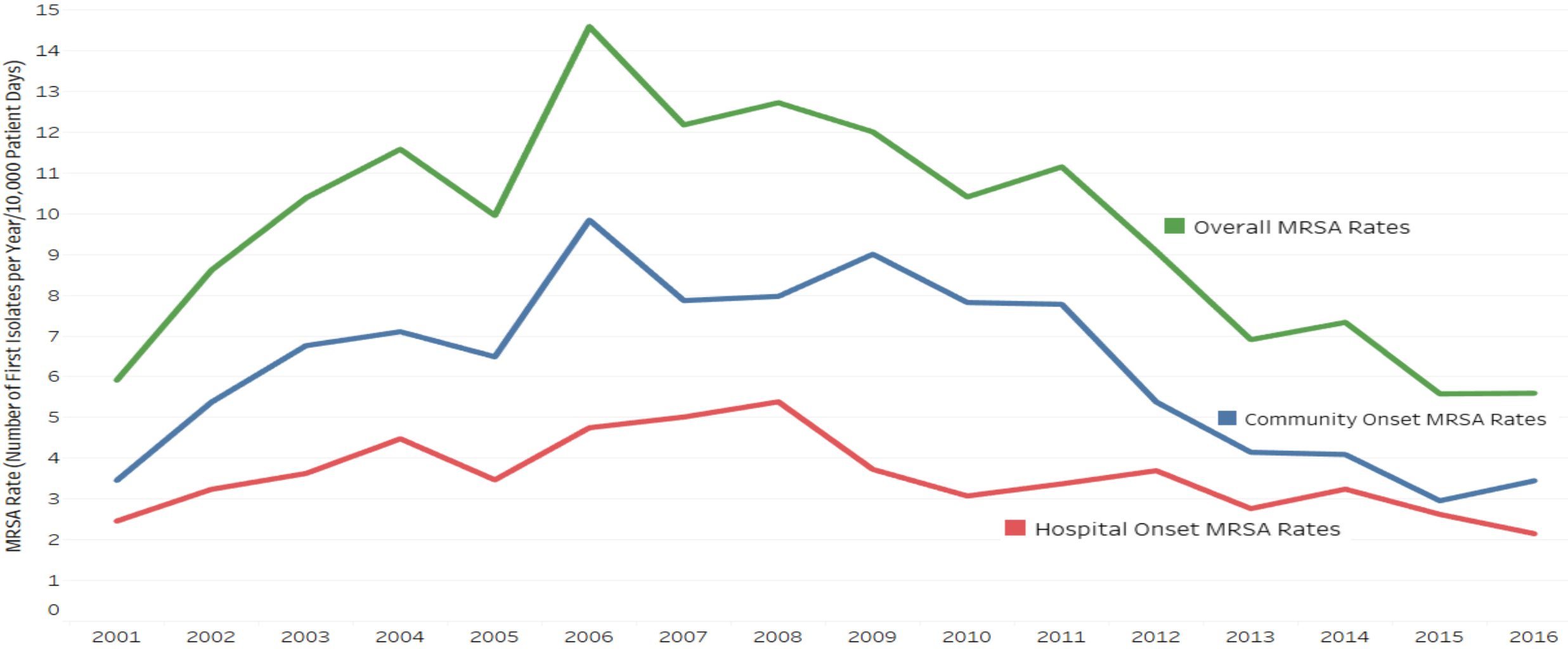

* MRSA positive culture >48 hours after admission or within 30 days post discharge excluding patients discharged to a healthcare facility or on hemodialysis

** MRSA positive culture <=48 hours after admission

# UCSF Health: HH x MDRO

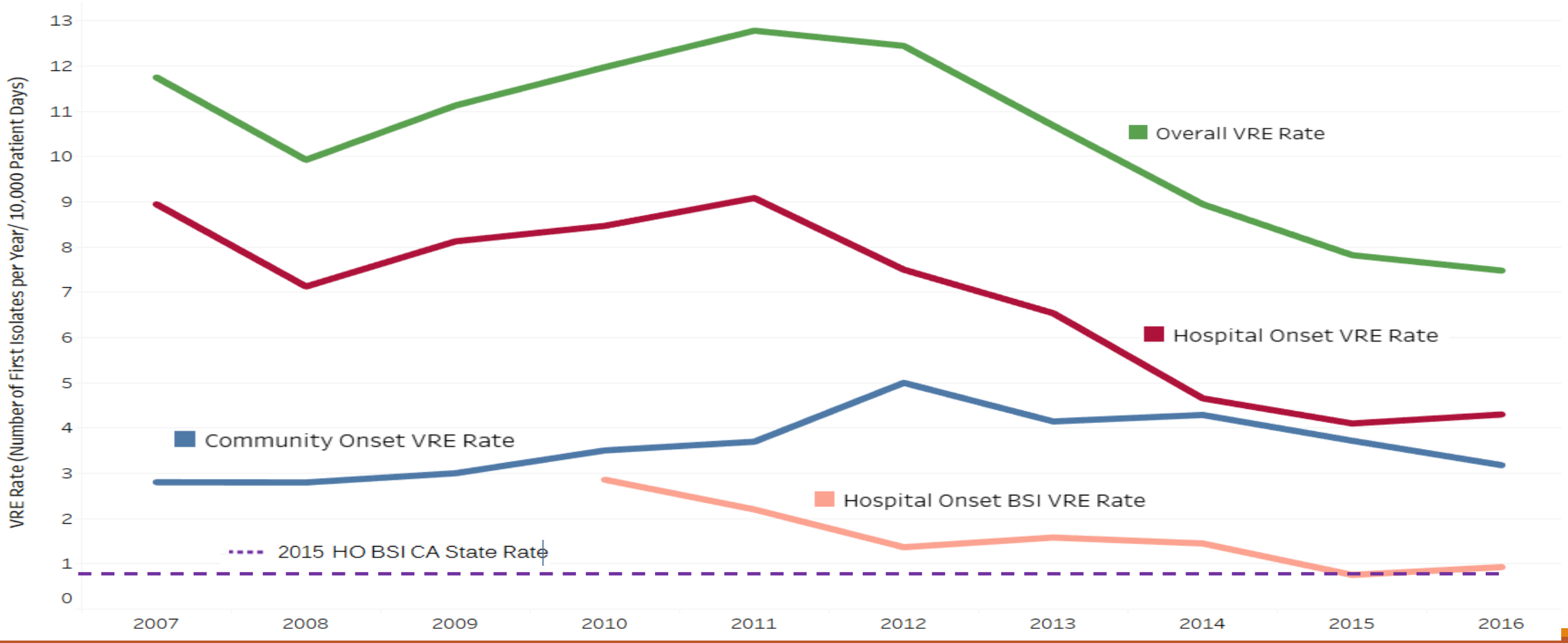


# UCSF Health: Methicillin-Resistant *Staphylococcus aureus* (MRSA)
Inpatient Adult and Pediatric Patients
MRSA/10,000 Patient Days
2001-2016

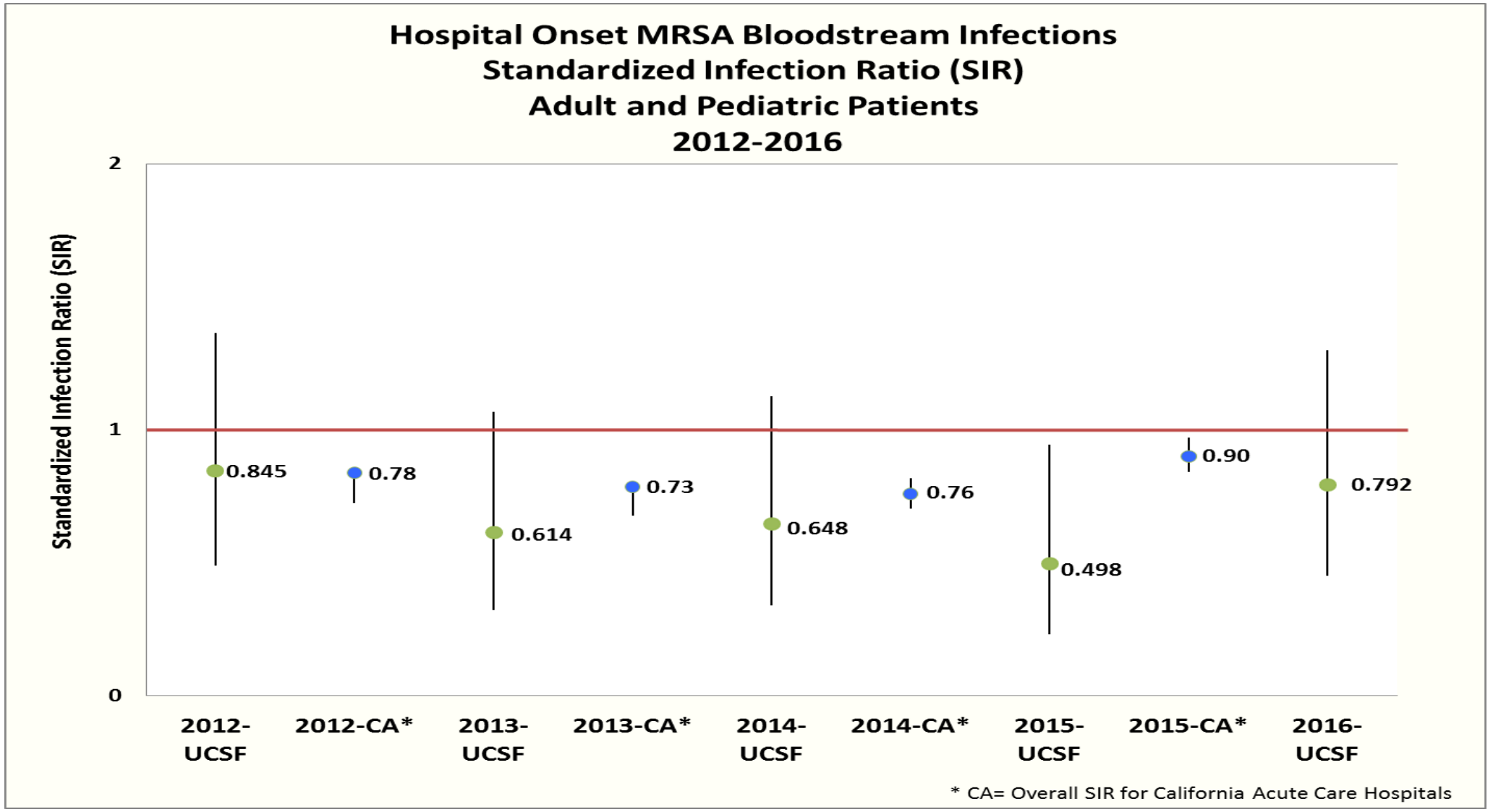



**Hospital Onset: Specimen collected ≥ 3 days after admission**

# UCHF Health: Vancomycin-Resistant *Enterococcus* (VRE)
# Inpatient Adult and Pediatric Patients
# VRE/10,000 Patient Days
# 2007-2016




**Hospital Onset: Specimen collected ≥ 3 days after admission**




| | 2012 | 2012-CA* | 2013 | 2013-CA* | 2014 | 2014-CA* | 2015 | 2015-CA* | 2016 | 2016-CA* |
|---|---|---|---|---|---|---|---|---|---|---|
| O / E | 12 / 17.45 | 728 / 933.33 | 11 / 17.92 | 698 / 956.16 | 11 / 16.96 | 705/927.82 | 8/16.076 | 751/831.75 | 14/17.86 | |
| p Value | 0.5324 | 0.0000 | 0.0886 | 0.0000 | 0.1360 | 0.0000 | 0.0306 | 0.0048 | 0.3675 | Not Yet Available |
| 95% CI, lower | 0.491 | 0.725 | 0.323 | 0.677 | 0.341 | 0.705 | 0.231 | 0.84 | 0.446 | |
| 95% CI, upper | 1.366 | 0.838 | 1.067 | 0.786 | 1.127 | 0.817 | 0.945 | 0.969 | 1.284 | |

SIR= calculated by dividing the number of observed HO MRSA BSIs by the number of predicted MRSA BSIs.

# Declining MRSA and VRE without Contact Isolation

2006: ceased isolating VRE; Standard Precautions educational blitz

2011: Robust hand hygiene program

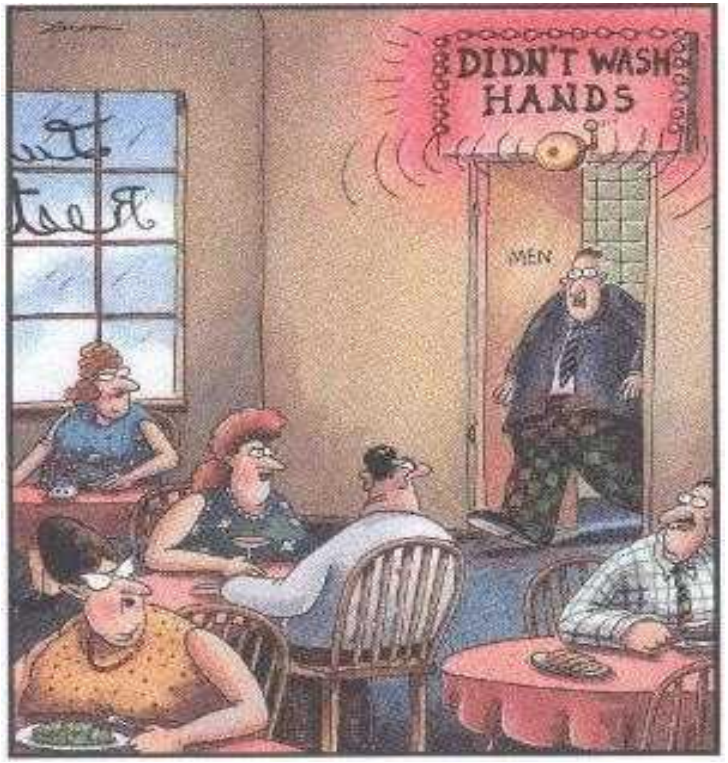
2011: Robust cleaning engagement

2013: CHG as default product for daily bathing

2016: ASP Reboot

# Vote for Less Intervention!

- Focus effort on basic Infection Prevention
- Drive reliable adherence to Standard Precautions for ALL patients
- Use local data to support a change in practice
- Free patients from unwarranted isolation



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