# Best Practices in Infection Control – What should we be striving for ?

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# Overview

- Hand Hygiene
- Planning & Designing
- Surveillance
- Interventions
- Bundles
- Training & Development
- Quality Indicators
- HCW Safety
- Lab

# Amygdala Complex !!

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# Solving the puzzle….. When

- The Five Moments is one puzzle solving approach to emerge internationally and be innovative in changing the 'culture‘

- It supports all aspects of the multi-modal implementation strategy


Something we have not been able to SOLVE…
If health care associated bugs looked like this – compliance with hand hygiene would be 100%!!!

# Use of IC Assessment Tool

- Used in Swaziland, South Africa, & Guatemala
- Interventions to improve hand hygiene & waste management
  - Staff education
  - New procedures
  - Improve availability of supplies
- Increase in compliance
  - hand hygiene from 57% to 86%
  - contaminated waste policies from 38% to 73%



Hand hygiene campaign at Rustenburg Provincial Hospital in South Africa.

Goredema W, et al. Improving Hospital Infection Control: South Africa and Swaziland. Workshop on Local and Regional Actions to Address Antimicrobial Resistance Moshi, Tanzania, November 10-14, 2008

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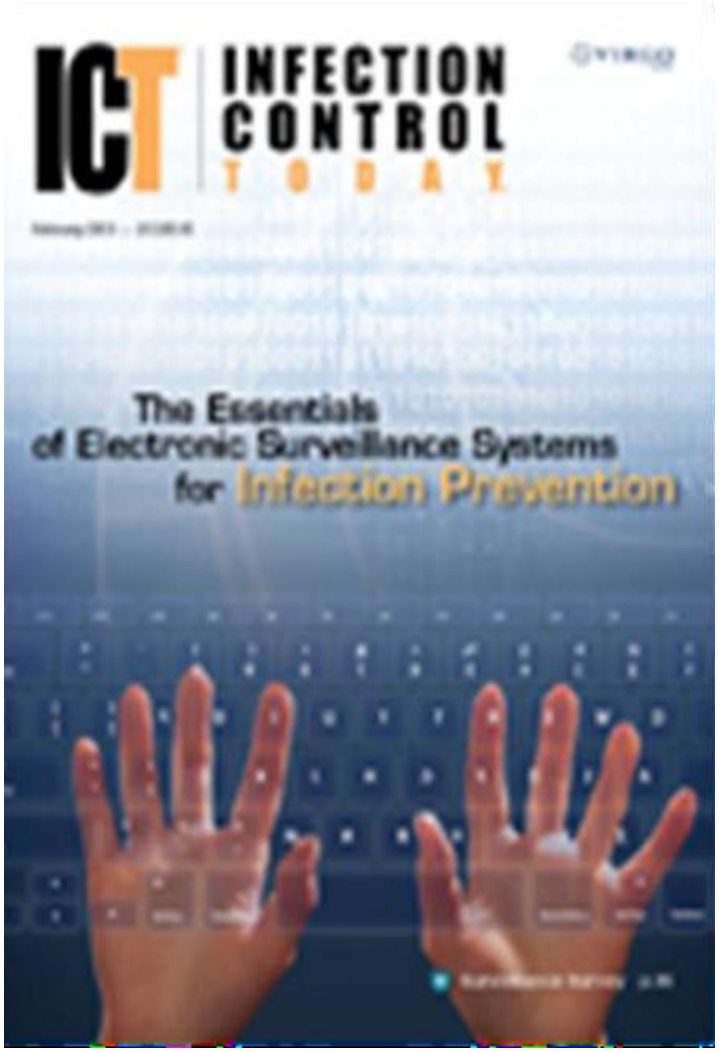
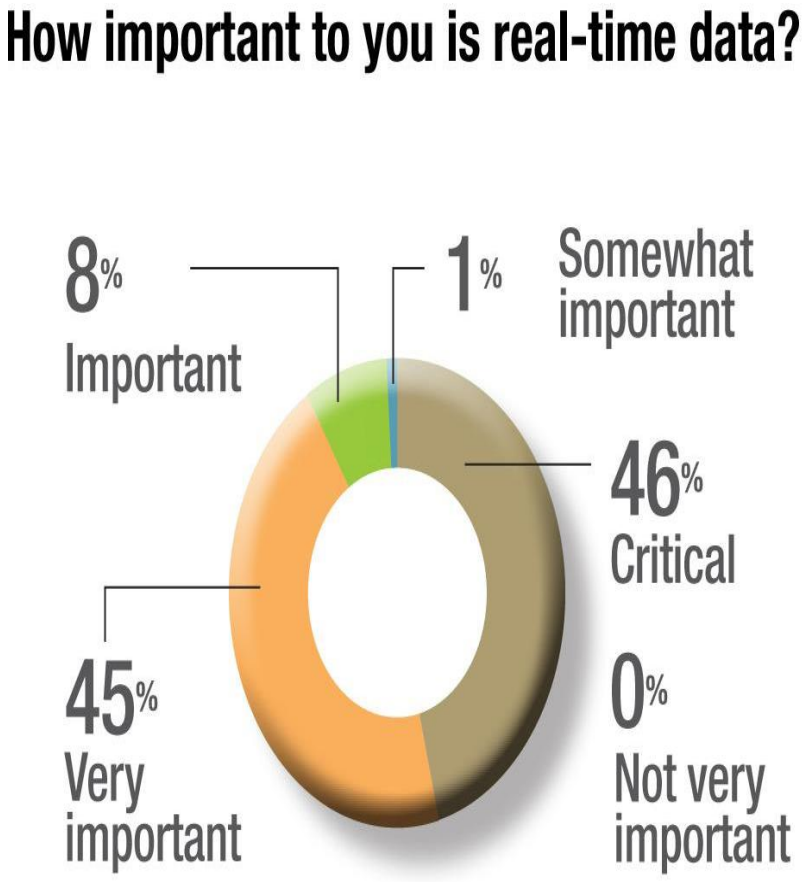
# E Surveillance

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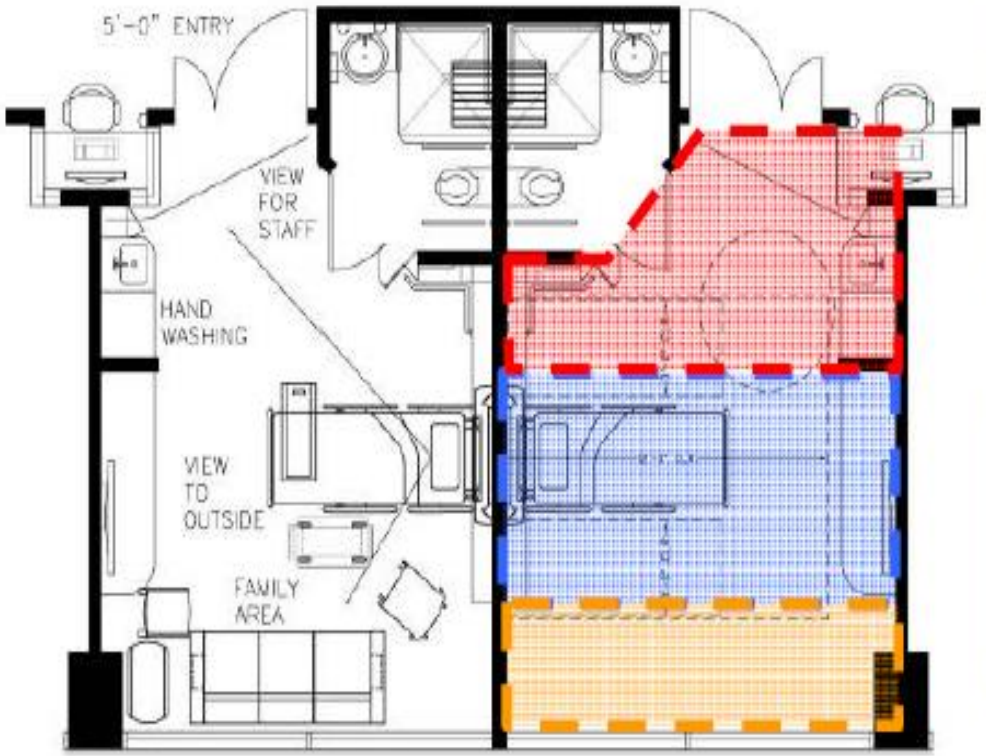
# What's wrong with this picture?

# *Private Medical / Surgical Patient Room*




STAFF ZONE

PATIENT ZONE

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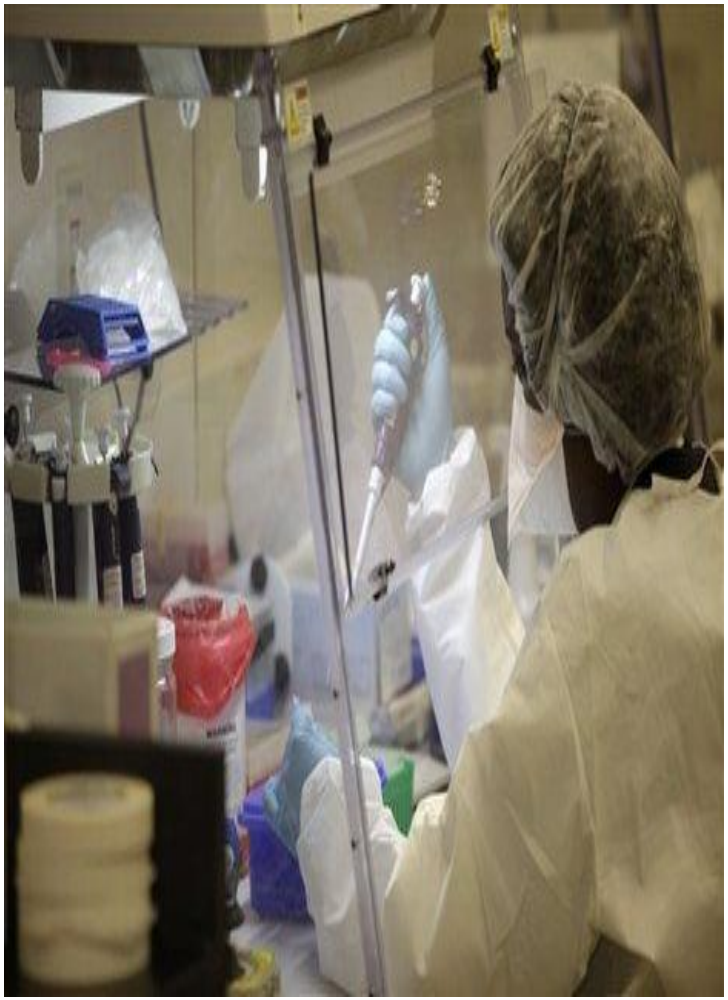
# Lab & Blood Bank



- Storage Safety
- Autoclave
- Bio-Safety Cabinets
- Clean – Soiled
- PPE
- Drains
- Disposals

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# Models which have delivered

# World HAI Forum

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# World HAI Forum: Priorities

Position paper, 4th World Healthcare-associated Infections Forum
AH, v8 31.10.13

Table 2. The ten most urgent priorities for action against the spread of antimicrobial resistance cited by attendees of the 4th WHAI Forum.

| **Urgent priorities for action against the global spread of antimicrobial resistance** |
|---|
| *For policy-makers and health authorities:* |
| Limit the use of antimicrobials in food-producing animals by banning non-therapeutic applications, including growth promotion and metaphylaxis |
| Establish and enforce regulations on sales of antimicrobials for use in human medicine, including prohibition of over-the-counter sales worldwide |
| Develop a detailed charter on antimicrobial conservation to be ratified and upheld by ministries of health worldwide |
| Develop coordinated and culturally sensitive awareness campaigns targeting the general public and imparting the importance of protecting antimicrobials as a limited and non-renewable resource |
| Rigorously support the improvement of sanitation systems to eliminate resistant microbes in wastewater; regularly provide education about fundamental hygiene practices such as hand-washing to prevent the spread of infection |
| Together with the pharmaceutical industry, explore (1) incentives to stimulate research and fast-track development of novel antimicrobials and (2) new economic models that reconcile public health interests with industry profitability |
| *For the human and veterinary healthcare communities:* |
| Establish standardized, universal methods and metrics for surveillance of antimicrobial use and resistance development, respectively |
| In medical and veterinary school curricula, require universal and detailed instruction in microbial resistance development and the prudent use of antimicrobials; for physicians and veterinarians in training, require on-the-job refresher courses |
| *For the general public:* |
| Include patients and other antimicrobial consumers in the development and implementation |

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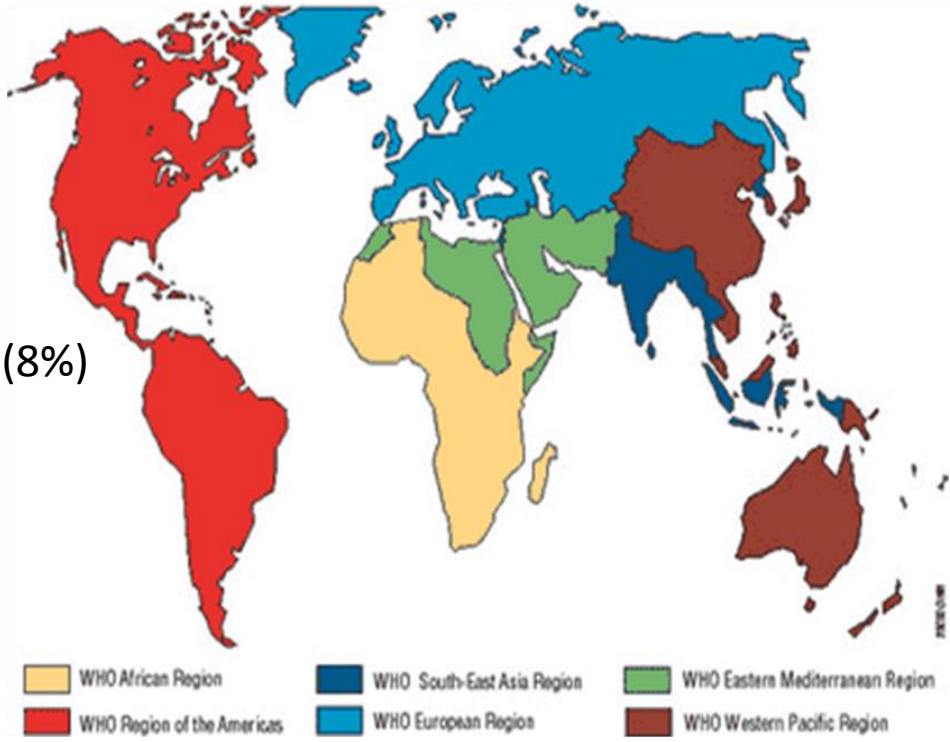
# ARPEC: Hospital based Neonatal and Paediatric Antimicrobial Point Prevalence Survey

**190 centres participating in WP5**

- European Region: 146(77%)
- American Region: 11(6%)
- African Region: 6(3%)
- Eastern Mediterranean Region: 16(8%)
- Western Pacific Region: 5(3%)

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# Key prescription patterns paediatric patients

| | India N(%) | Europe N(%) |
|---|---|---|
| **All patients under antibiotic treatment** | | |
| IV Therapy | 126(95%) | 2232(71%) |
| Multiple antibiotics | 76(57%) | 1056(34%) |
| **All surgical patients** | | |
| Receiving surgical prophylaxis | 23(40%) | 230(39%) |
| Surgical prophylaxis >1d | 21(91%) | 175(76%) |
| **All PICU patients** | | |
| Receiving surgical prophylaxis | 14(44%) | 55(16%) |
| Surgical prophylaxis >1d | 11(79%) | 36(65%) |
| Multiple antibiotics | 19(59%) | 173(50%) |

# The Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals

Department of Health and Human Services
Centers for Disease Control and Prevention

Infection Control Home > Healthcare-Associated Infections >

## SHEA/IDSA HAI Prevention Compendium

The Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA) sponsored and authored a compendium of practice recommendations to prevent healthcare-associated infections in acute care hospitals in partnership with the Association for Professionals in Infection Control and Epidemiology (APIC), the Joint Commission, and the American Hospital Association (AHA). The compendium is available for download in the October 2008 Supplement of Infection Control & Hospital Epidemiology (Volume 29, Number S1).

As the CDC continues to produce official guidelines in collaboration with professional societies and academic partners, implementation tools such as this compendium will serve as a means to ensure that the best practices for infection prevention are successfully brought to the bedside.

### SHEA/IDSA HAI Prevention Compendium

- October 2008 Supplement of Infection Control & Hospital Epidemiology *
  (Please note: this link will open in a new browser window.) (Volume 29, Number S1)
  Supplement Article: Editorial Primum Non Nocere * (Please note: this link will open in a new browser window.)

The following patient guides were developed by the SHEA Patient Safety and Quality Improvement Committee in collaboration with CDC:


**FAQ's about Catheter-Associated Bloodstream Infections**
A bloodstream infection can occur when bacteria or other germs travel down a "central line" and enter the blood.

8.5" x 11" poster
- View larger image

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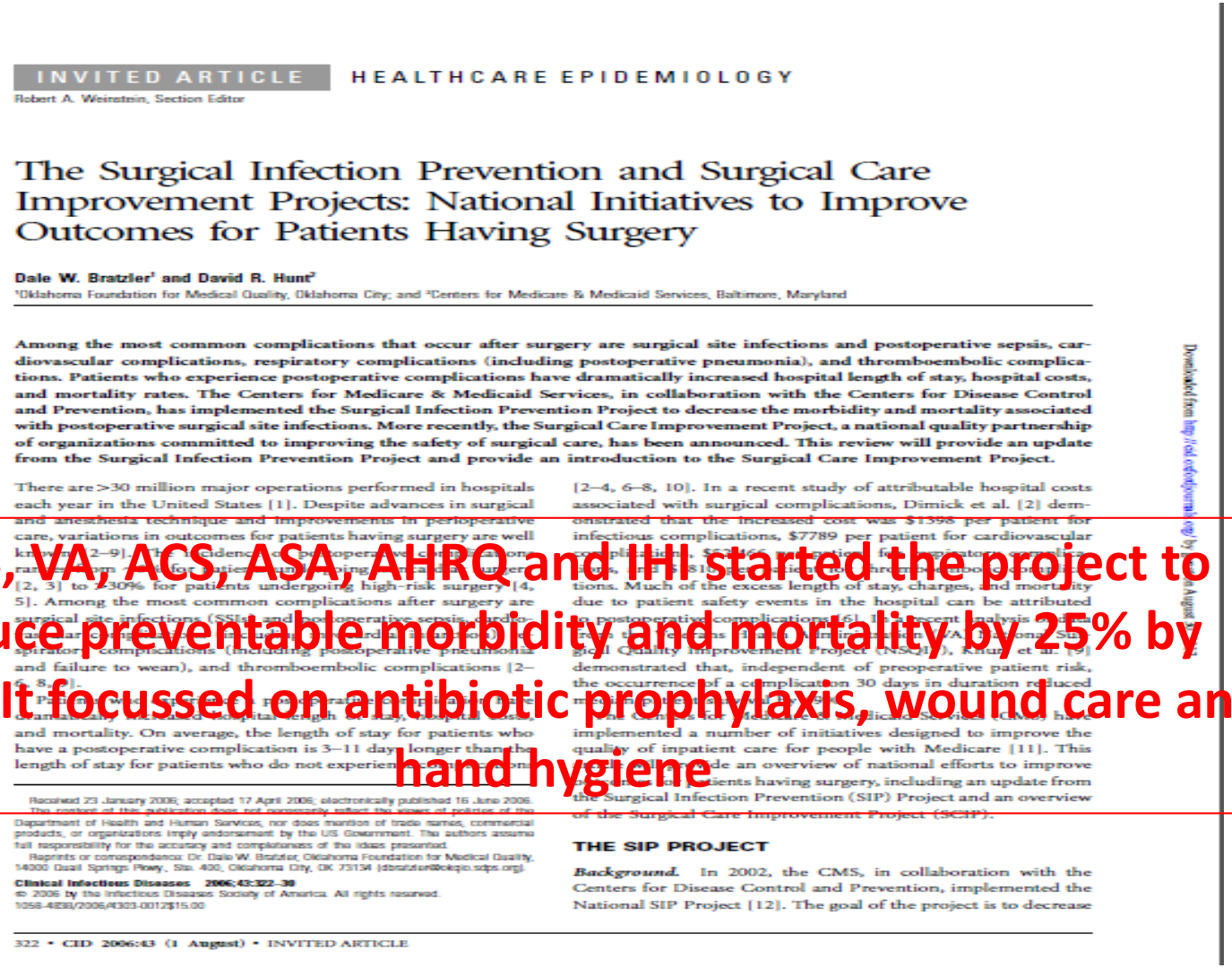
# SCIP Project: SSI



INVITED ARTICLE HEALTHCARE EPIDEMIOLOGY

Robert A. Weinstein, Section Editor

## The Surgical Infection Prevention and Surgical Care Improvement Projects: National Initiatives to Improve Outcomes for Patients Having Surgery

**Dale W. Bratzler[1] and David R. Hunt[2]**

[1]Oklahoma Foundation for Medical Quality, Oklahoma City; and [2]Centers for Medicare & Medicaid Services, Baltimore, Maryland

**Among the most common complications that occur after surgery are surgical site infections and postoperative sepsis, cardiovascular complications, respiratory complications (including postoperative pneumonia), and thromboembolic complications. Patients who experience postoperative complications have dramatically increased hospital length of stay, hospital costs, and mortality rates. The Centers for Medicare & Medicaid Services, in collaboration with the Centers for Disease Control and Prevention, has implemented the Surgical Infection Prevention Project to decrease the morbidity and mortality associated with postoperative surgical site infections. More recently, the Surgical Care Improvement Project, a national quality partnership of organizations committed to improving the safety of surgical care, has been announced. This review will provide an update from the Surgical Infection Prevention Project and provide an introduction to the Surgical Care Improvement Project.**

There are >30 million major operations performed in hospitals each year in the United States [1]. Despite advances in surgical and anesthesia technique and improvements in perioperative care, variations in outcomes for patients having surgery are well kn[illegible] [2–9]. [illegible] ...ratory complications (including postoperative pneumonia) and failure to wean), and thromboembolic complications [2–6, 8–9].

[illegible] ...and mortality. On average, the length of stay for patients who have a postoperative complication is 3–11 days longer than the length of stay for patients who do not experien[illegible]

[2–4, 6–8, 10]. In a recent study of attributable hospital costs associated with surgical complications, Dimick et al. [2] demonstrated that the increased cost was $1398 per patient for infectious complications, $7789 per patient for cardiovascular complications, $[illegible] per patient for respiratory complications, and $[illegible] per patient for thromboembolic complications. Much of the excess length of stay, charges, and mortality due to patient safety events in the hospital can be attributed to postoperative complications [6]. In a recent analysis of [illegible] ...gical Quality Improvement Project (NSQIP)), Khuri et al. [9] demonstrated that, independent of preoperative patient risk, the occurrence of a complication 30 days in duration reduced [illegible] ...implemented a number of initiatives designed to improve the quality of inpatient care for people with Medicare [11]. This [illegible] ...de an overview of national efforts to improve [illegible] ...patients having surgery, including an update from the Surgical Infection Prevention (SIP) Project and an overview of the Surgical Care Improvement Project (SCIP).

### THE SIP PROJECT

***Background.*** In 2002, the CMS, in collaboration with the Centers for Disease Control and Prevention, implemented the National SIP Project [12]. The goal of the project is to decrease

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**Clinical Infectious Diseases 2006;43:322–30**



1058-4838/2006/4303-0012$15.00





**CMS, VA, ACS, ASA, AHRQ and IHI started the project to reduce preventable morbidity and mortality by 25% by 2010.. It focussed on antibiotic prophylaxis, wound care and hand hygiene**

Bratzler and Hunt et al, CID; 2006; 63

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# SENIC, SCQIP and Strategies

A Performance Monitoring Resource for Critical Access Hospitals, States, and Communities

Flex Monitoring Team | University of Minnesota, University of North Carolina at Chapel Hill, University of Southern Maine

Policy Brief #29
August 2012

## Evidence-Based Surgical Care Quality Improvement Programs and Strategies for Critical Access Hospitals

*Jill Klingner RN, PhD; Michelle Casey, MS; Shailendra Prasad MBBS, MPH; Walter Gregg MA, MPH; Ira Moscovice PhD*
*University of Minnesota Rural Health Research Center*

*This brief is one in a series of policy briefs identifying and assessing evidence-based patient safety and quality improvement interventions appropriate for use by state Flex Programs and Critical Access Hospitals (CAHs).*

**Introduction**
This report focuses on evidence-based surgical care QI programs and strategies that are applicable to inpatient and outpatient surgeries in CAHs. The Flex Monitoring Team prepared this report as part of a larger project, whose purpose is: 1) to identify successful evidence-based QI programs and strategies that could be replicated in CAHs and 2) to disseminate information about these programs and strategies to State Flex Programs.

**Background**
QI programs can encompass a wide range of strategies, and many QI interventions include multiple strategies, which has made it difficult to evaluate their effectiveness. There is a growing awareness that QI strategies need to rest on a strong evidence base, and that greater attention needs to be paid to understanding why particular interventions work and the factors that affect their success in different settings.[1-3]

*Quality Improvement and the Flex Program*
Improving the quality of care provided by CAHs is an important goal of the Medicare Rural Hospital Flexibility (Flex) Program. Throughout the Flex Program, CAHs have implemented a range of QI activities with support from State Flex Programs, as documented by previous Flex Monitoring Team CAH surveys and case studies.[4-6] Support for QI in CAHs is a core activity area of focus in the current State Flex Program Grant Guidance. The Federal Office of Rural Health Policy, through the Flex Program, has implemented a new special project, the Medicare Beneficiary Quality Improvement Project (MBQIP). MBQIP is focused on Medicare beneficiary health status improvement, which makes it especially important to identify successful QI programs that can be replicated in CAHs. MBQIP is being

### Key Findings

- The peer-reviewed literature on surgical care quality improvement (QI) primarily addresses programs and strategies that were implemented as part of the national Surgical Care Improvement Project (SCIP) and reporting of surgical care quality measures to the Centers for Medicare and Medicaid Services (CMS).
- These QI programs and strategies focus on improving three aspects of surgical care: 1) prevention of surgical infections; 2) prevention of venous thromboembolism; and 3) prevention of adverse cardiac events.
- Although few peer-reviewed articles specifically address implementation of surgical care QI programs and strategies in Critical Access Hospitals (CAHs), several programs and strategies have been found to be effective and could be replicated in CAHs.

This study was conducted by the Flex Monitoring Team with funding from the Federal Office of Rural Health Policy (PHS Grant No. U27RH01080).

Klinger et al; US Policy on CAHs, 2009

# Keystone Project: CLABSI

BMJ

RESEARCH

## Sustaining reductions in catheter related bloodstream infections in Michigan intensive care units: observational study

Peter J Pronovost, professor,[1] Christine A Goeschel, director, patient safety and quality initiatives,[1] Elizabeth Colantuoni, assistant professor,[1] Sam Watson, senior vice president, patient safety and quality,[2] Lisa H Lubomski, assistant professor,[1] Sean M Berenholtz, associate professor,[1] David A Thompson, assistant professor,[1] David J Sinopoli, instructor,[3] Sara Cosgrove, assistant professor,[4] J Bryan Sexton, associate professor,[1] Jill A Marsteller, assistant professor,[5] Robert C Hyzy, associate professor,[6] Robert Welsh, chief,[7] Patricia Posa, special project coordinator,[8] Kathy Schumacher, director, quality, safety, standards and outcomes,[9] Dale Needham, assistant professor[10]

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Cite this as: BMJ 2010;340:c309
doi:10.1136/bmj.c309

ABSTRACT

**Objectives** To evaluate the extent to which intensive care units participating in the initial Keystone ICU project sustained reductions in rates of catheter related bloodstream infections.

**Design** Collaborative cohort study to implement and evaluate interventions to improve patients' safety.

**Setting** Intensive care units predominantly in Michigan, USA.

**Intervention** Conceptual model aimed at improving clinicians' use of five evidence based recommendations to reduce rates of catheter related bloodstream infections (rates, with measurement and feedback of infection rates. During the sustainability period, intensive care unit teams were instructed to integrate this intervention into staff orientation, collect monthly data from hospital infection control staff, and report infection rates to appropriate stakeholders.

**Main outcome measures** Quarterly rate of catheter related bloodstream infections per 1000 catheter days during the sustainability period (19-36 months after implementation of the intervention).

**Results** Ninety (87%) of the original 103 intensive care units participated, reporting 1532 intensive care unit months of data and 300 310 catheter days during the sustainability period. The mean and median rates of catheter related bloodstream infection decreased from 7.7 and 2.7 (interquartile range 0.6-4.8) at baseline to 1.3 and 0 (0-2.4) at 16-18 months and to 1.1 and 0 (0.0-1.2) at 34-36 months post-implementation. Multilevel regression analysis showed that incidence rate ratios decreased from 0.68 (95% confidence interval 0.53 to 0.88) at 0-3 months to 0.38 (0.26 to 0.56) at 16-18 months and 0.34 (0.24-0.48) at 34-36 months post-implementation. During the sustainability period, the mean bloodstream infection rate did not significantly change from the initial 18 month post-implementation period (−1%, 95% confidence interval −9% to 7%).

**Conclusions** The reduced rates of catheter related bloodstream infection achieved in the initial 18 month post-implementation period were sustained for an additional 18 months as participating intensive care units integrated the intervention into practice. Broad use of this intervention with achievement of similar results could substantially reduce the morbidity and costs associated with catheter related bloodstream infections.

INTRODUCTION

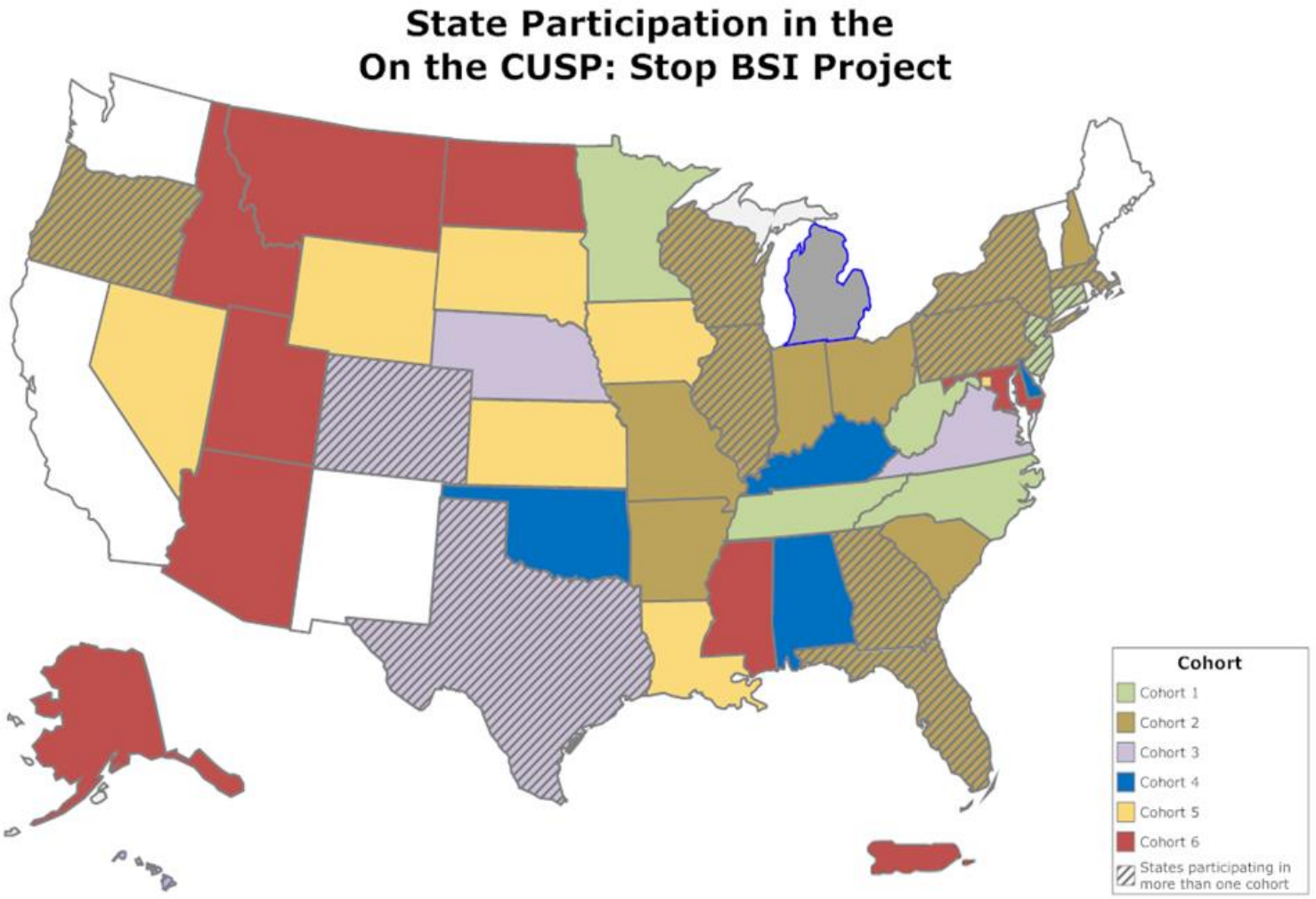
Catheter related bloodstream infections cause considerable morbidity, mortality, and healthcare costs.[1 2] An estimated 82 000 catheter related bloodstream infections and up to 28 000 attributable deaths occur in intensive care units annually,[3] and each infection costs about $45 000 (£28 000; €31 000).[4] In an ongoing quality improvement project, known as the Michigan Health & Hospital Association (MHA) Keystone ICU project, these infections were substantially reduced in 103 participating intensive care units.[5] The median infection rate per 1000 catheter days dropped from 2.7 at baseline to 0 within three months after implementation of an evidence based intervention. Eighteen months after implementation, infection rates had decreased by 66% from baseline. However, whether these initial results were sustained was not known.

Limited evidence assessing the sustainability of quality improvement projects beyond the initial implementation and evaluation period is available.[6 7] To evaluate sustainability, a quality improvement project must have an adequate infrastructure to sustain activities beyond its initial phase. After the 18 month post-implementation evaluation period, most hospitals participating in the Keystone ICU project continued to submit data on infection rates. The objective of this study was to evaluate the extent to which intensive care units participating in the initial Keystone ICU project sustained reductions in rates of catheter related bloodstream



Peter Pronovost et al; BMJ; 2010; 994

# CUSP Project



# National Study: CAUTI

MAJOR ARTICLE

## Preventing Hospital-Acquired Urinary Tract Infection in the United States: A National Study

Sanjay Saint,[1,2,3] Christine P. Kowalski,[1] Samuel R. Kaufman,[2,3] Timothy P. Hofer,[1,2,3] Carol A. Kauffman,[1,2] Russell N. Olmsted,[5] Jane Forman,[1] Jane Banaszak-Holl,[4] Laura Damschroder,[1,2] and Sarah L. Krein[1,2]

[1]Veterans Affairs Ann Arbor Healthcare System, [2]Department of Internal Medicine, University of Michigan Medical School, [3]Veterans Affairs/University of Michigan Patient Safety Enhancement Program, [4]University of Michigan School of Public Health, and [5]Saint Joseph Mercy Health Care System, Ann Arbor, Michigan

(See the editorial commentary by Nicolle on pages 251–3)

***Background.*** Although urinary tract infection (UTI) is the most common hospital-acquired infection in the United States, to our knowledge, no national data exist describing what hospitals in the United States are doing to prevent this patient safety problem. We conducted a national study to examine the current practices used by hospitals to prevent hospital-acquired UTI.

***Methods.*** We mailed written surveys to infection control coordinators at a national random sample of non-federal US hospitals with an intensive care unit and ≥50 hospital beds ($n = 600$) and to all Veterans Affairs (VA) hospitals ($n = 119$). The survey asked about practices to prevent hospital-acquired UTI and other device-associated infections.

***Results.*** The response rate was 72%. Overall, 56% of hospitals did not have a system for monitoring which patients had urinary catheters placed, and 74% did not monitor catheter duration. Thirty percent of hospitals reported regularly using antimicrobial urinary catheters and portable bladder scanners; 14% used condom catheters, and 9% used catheter reminders. VA hospitals were more likely than non-VA scanners (49% vs. 29%; $P < .001$), condom catheters (46% vs. 12%; $P < .001$), 9%; $P < .001$); non-VA hospitals were more likely to use antimicrobial urin .002).

***Conclusions.*** Despite the strong link between urinary catheters and subs that appeared to be widely used to prevent hospital-acquired UTI. The most ultrasound and antimicrobial catheters—were each used in fewer than one-thir reminders, which have proven benefits, were used in <10% of US hospitals.

Hospital-acquired infections are a common, costly, and potentially lethal patient safety problem [1, 2]. The most common hospital-acquired infection is urinary tract infection (UTI), which accounts for almost 40% of all nosocomial infections [3–5]. Most hospital-acquired UTIs are associated with urinary catheters, a commonly used device among hospitalized patients. Up to 25% of hospitalized patients have a urinary catheter placed during their cause considerable patients [7–9]. Th with nosocomial U costs [9–11].

Several practices pital-acquired UTI ing indwelling cath catheters when no reminder systems, tients at highest ri condom-style) cath portable ultrasound residual urine amo technique, and usin catheters, such as s ization [13]. Practic because of lack of e

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The views expressed in this article are those of the authors and do not necessarily reflect the position or policy of the Department of Veterans Affairs.

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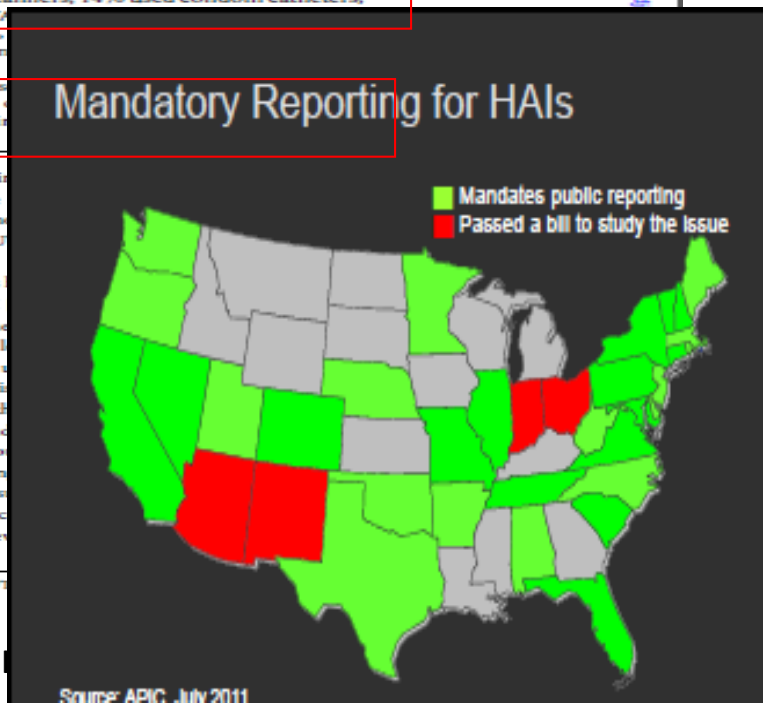
DOI: 10.1086/524662





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# "The Chennai Declaration" Recommendations of "A roadmap- to tackle the challenge of antimicrobial resistance" - A joint meeting of medical societies of India

**Ghafur A, Mathai D[1], Muruganathan A[2], Jayalal JA[3], Kant R[4], Chaudhary D[5], Prabhash K[6], Abraham OC[7], Gopalakrishnan R[8], Ramasubramanian V[9], Shah SN[10], Pardeshi R[11], Huilgol A[12], Kapil A[13], Gill JPS[14], Singh S[15], Rissam HS[16], Todi S[17], Hegde BM[18], Parikh P[19]**

Coordinator, Road map meeting and Antibiotic Stewardship Committee Chairperson, Clinical infectious Diseases Society, [1]President CIDS, [2]President Elect API, [3]Indian Medical Association, [4]President, Association of Surgeons of India, [5]Indian Society of Critical Care Medicine, [6]DM Indian Society of Medical and Paediatric Oncology, [7]Secretary CIDS, [8]Organising Secretary CIDSCSON, [9]Organising Chairman, CIDSCON, [10]Editor, JAPI, [11]Federation of Obstetric and Gynaecological Societies of India, [12]President, Indian Society of Organ Transplantation, [13]Indian Association of Medical Microbiologists, [14]Director, School of Public Health and Zoonoses, GADVASU, [15]Chairman, Research Committee, NABH, [16]Member, Board of Governors, Medical Council of India, [17]Panel member of Ministry of Health & Educati

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# A Road Map- To Tackle Antimicrobial Resistance

## August 24th 2012,Chennai

### As a preconference session of CIDSCON 2012

### A joint effort by Indian Medical Societies

- **Representatives of**
  - Clinical Infectious Diseases Society
  - Association of Physicians of India
  - Oncology Society
  - Critical care Society
  - Indian Medical Association
  - Hospital infection Society
  - Microbiology society
  - Surgical society
  - Gynaecology Society
  - **World health Organization**
  - **NABH**
  - **Indian Council of medical research**
  - **DCGI**
  - **Govt.representatives**

Overseas Representatives from various continents

- Herman Goossens
- Dilip Nathwani
- Stephan Harbarth
- Arjun Sreenivas
- David Paterson
- Paul Thambyah

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# Neonatal Collaborative – India
# Cincinatti Children's Collaborative model


AIIMS, Delhi
PGI Chandigarh
Amrita Institute, Kochi
Ganga Ram, Delhi
Presidency College, WB
Fernandez, Hyderabad
NICE, Hyderabad
HCG, Bangalore
KIMS, TVM

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# Global Patient Safety Agenda



SUPPLEMENT ARTICLE: INTRODUCTION

## Improving Patient Safety Through Infection Control: A New Healthcare Imperative

Deborah S. Yokoe, MD, MPH; David Classen, MD, MS

Many healthcare organizations, professional associations, government and accrediting agencies, legislators, regulators, payers, and consumer advocacy groups have advanced the prevention of healthcare-associated infections as a national imperative, stimulating the creation of "A Compendium of Strategies to Prevent Healthcare-Associated Infections in Acute Care Hospitals" in this supplement. In this introduction, we provide background and context and discuss the major issues that shaped the recommendations included in the compendium.

*Infect Control Hosp Epidemiol* 2008; 29:S3-S11



TABLE 1. National Healthcare-Associated Infection (HAI) Surveillance Initiatives

| Year | Event | Comment |
|---|---|---|
| 1970 | The CDC establishes the NNIS [4] | Hospitals voluntarily contribute surveillance data for internal monitoring and benchmarking |
| 1975 | Hospital-based infection control programs established | By 1974, more than half of US hospitals had organized surveillance programs with infection control nurses [5] |
| 1976 | JCAHO established [6] | Detailed surveillance system requirements are incorporated into JCAHO standards for accreditation |
| 1985 | The CDC publishes the results of the SENIC Project [7] | Results suggest that the combination of ongoing surveillance, active control efforts, and qualified staff could prevent up to one-third of HAIs |
| 2003 | Illinois is the first state to enact mandatory reporting of HAIs [8] | Hospitals are required to report process and outcome measures for central line–associated bloodstream infections, surgical site infections, and ventilator-associated pneumonia |
| 2005 | NNIS restructured into the NHSN [9] | National open enrollment for hospitals and outpatient dialysis centers in 2007 |
| 2005 | Deficit Reduction Act of 2005 passed [10] | The CMS requires hospitals to submit data on 10 quality measures, including antimicrobial prophylaxis process measures |

NOTE. CDC, Centers for Disease Control and Prevention; CMS, Centers for Medicare and Medicaid Services; JCAHO, Joint Commission for Accreditation of Healthcare Organizations; NHSN, National Healthcare Safety Network; NNIS, National Nosocomial Infections Surveillance; SENIC, Study on the Efficacy of Nosocomial Infection Control.

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International Journal for Quality in Health Care
Int. Journal for Quality in Health Care

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Advance Access Publication: 16 October 2012
10.1093/intqhc/mzs059

# Improving outcomes and reducing costs by modular training in infection control in a resource-limited setting

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## Abstract

**Objectives.** To study the impact of modular training and implementation of infection control practices on all health-care-associated infections (HAIs) in a cardiac surgery (CVTS) program of a tertiary care hospital.

**Design.** Baseline data were compared with post-intervention (with modular training) data.

**Settings.** This study was conducted in a cardiovascular surgical unit.

**Participants.** In total, 2838 patients were admitted in cardiovascular surgical service.

**Interventions.** Two training modules and online continuous education were delivered to all health-care workers in CVTS unit.

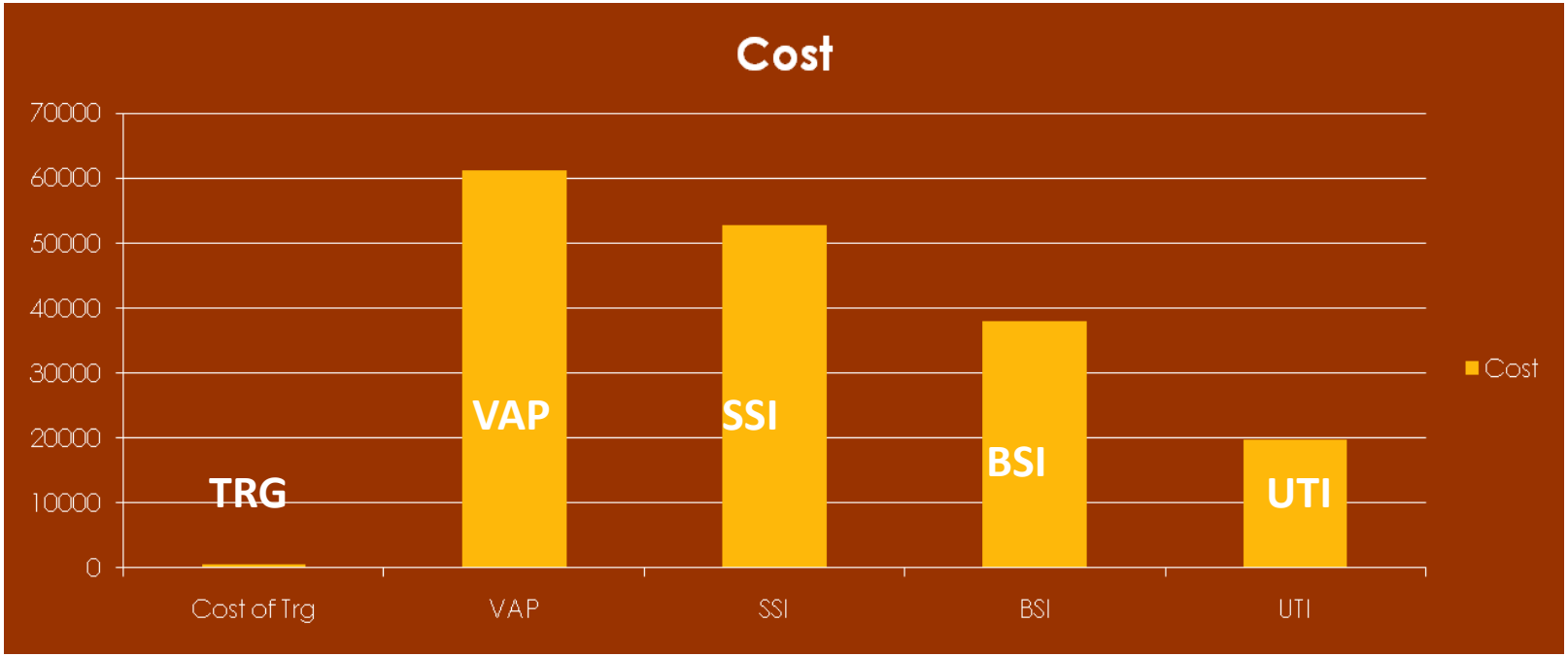
**Main Outcome Measures.** All four HAIs, such as surgical site infections (SSI), central line-associated blood stream infection (CLABSI), ventilator-associated pneumonia (VAP) and catheter-associated urinary tract infections (CA-UTI), were studied. Additional outcome measures included average length of stay cost of avoidance mortality and readmission rates.

**Results.** The SSI rate had decreased in the post-intervention phase from 46 to 3.27% per 100 surgeries ($P < 0.0001$), CLABSI had decreased from 44 to 3.10% per 1000 catheter days ($P < 0.009$), VAP was reduced from 65 to 4.8% per 1000 ventilator days ($P < 0.0001$) and CA-UTI had reduced from 37 to 3.48% per 1000 urinary catheter days ($P < 1.0$). For every $1 spent on training, the return on investment was $236 as cost of avoidance of healthcare associated infections (HAIs).

**Conclusions.** Standardization of infection control training and practices is the most cost-effective way to reduce HCAIs and related adverse outcomes.

**Keywords:** health-care-associated infections, surveillance, training and hospital cost

# Cost Effectiveness of IC Prog




| Cost Comparision: Infection Expenditure | |
|---|---|
| Event | Rs |
| Cost of Training | 669 |
| SSI | 52808 |
| BSI | 37942 |
| UTI | 19686 |
| VAP | 61140 |

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# Cost of HAI for each patient ($)

| | SSI | CLABSI | VAP | CA-UTI | Total |
|---|---|---|---|---|---|
| Direct Cost* | 48577 (1056) | 13659 (758) | 14001 (1272) | 4244 (353) | 80481 (925) |
| Indirect Cost# | 19568 (425) | 7002 (389) | 5093 (463) | 4257 (354) | 35920 (412) |
| Cost of excess LOS ** | 67320 (1463) | 21384 (1188) | 21780 (1980) | 4896 (408) | 115380 (1326) |
| Opportunity cost¶ | | | | | 168252 (1933) |
| Grand Total = | | | | | 400033 (4596) |

**With 1 $ of investment;**

**Return of Investment is 236 $**

# ASP: CAP in select States in USA

## Impact of an Antimicrobial Stewardship Intervention on Shortening the Duration of Therapy for Community-Acquired Pneumonia

Edina Avdic,[1] Lisa A. Cushinotto,[4] Andrew H. Hughes,[2] Amanda R. Hansen,[5] Leigh E. Efird,[1] John G. Bartlett,[2,3] and Sara E. Cosgrove[2,3]

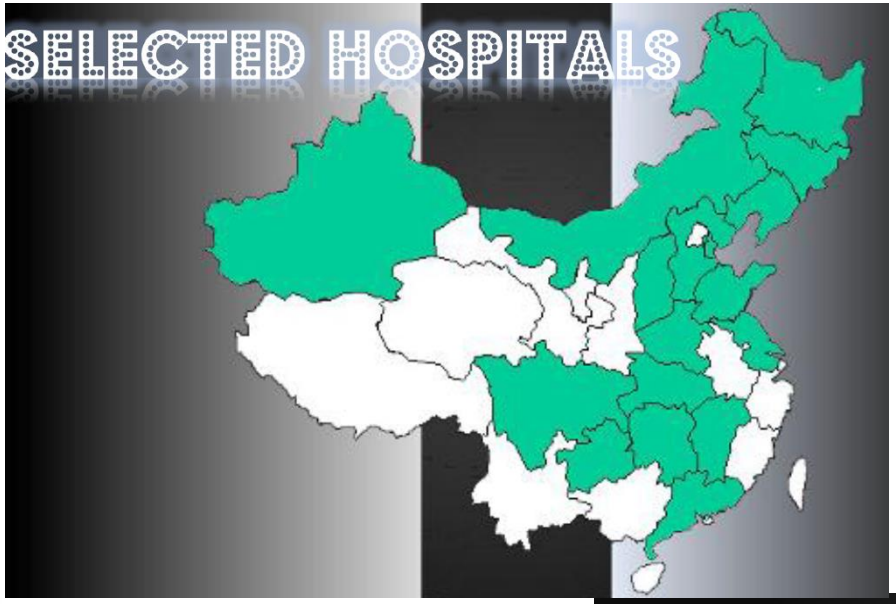
- Housestaff education including a survey regarding perceived best practice and sharing of baseline data
- Post-prescription prospective review of CAP cases

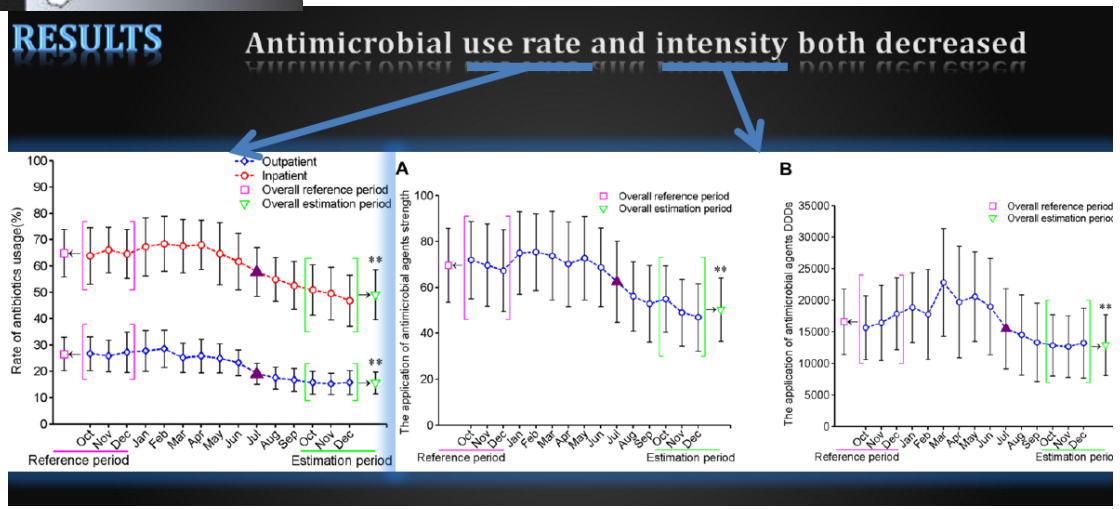
| | Baseline | Intervention |
|---|---|---|
| Median duration of therapy | 10 days | 7 days |
| Excess antibiotic days | 241 | 93 |
| Median excess duration of therapy | 4 days | 1 day |

No difference in 30-day readmission rate or *C. diff* infections

Avdic E et al. Clin Infect Dis. 2012; 54:1581

# China: Regulation on Antibiotic Use 2011

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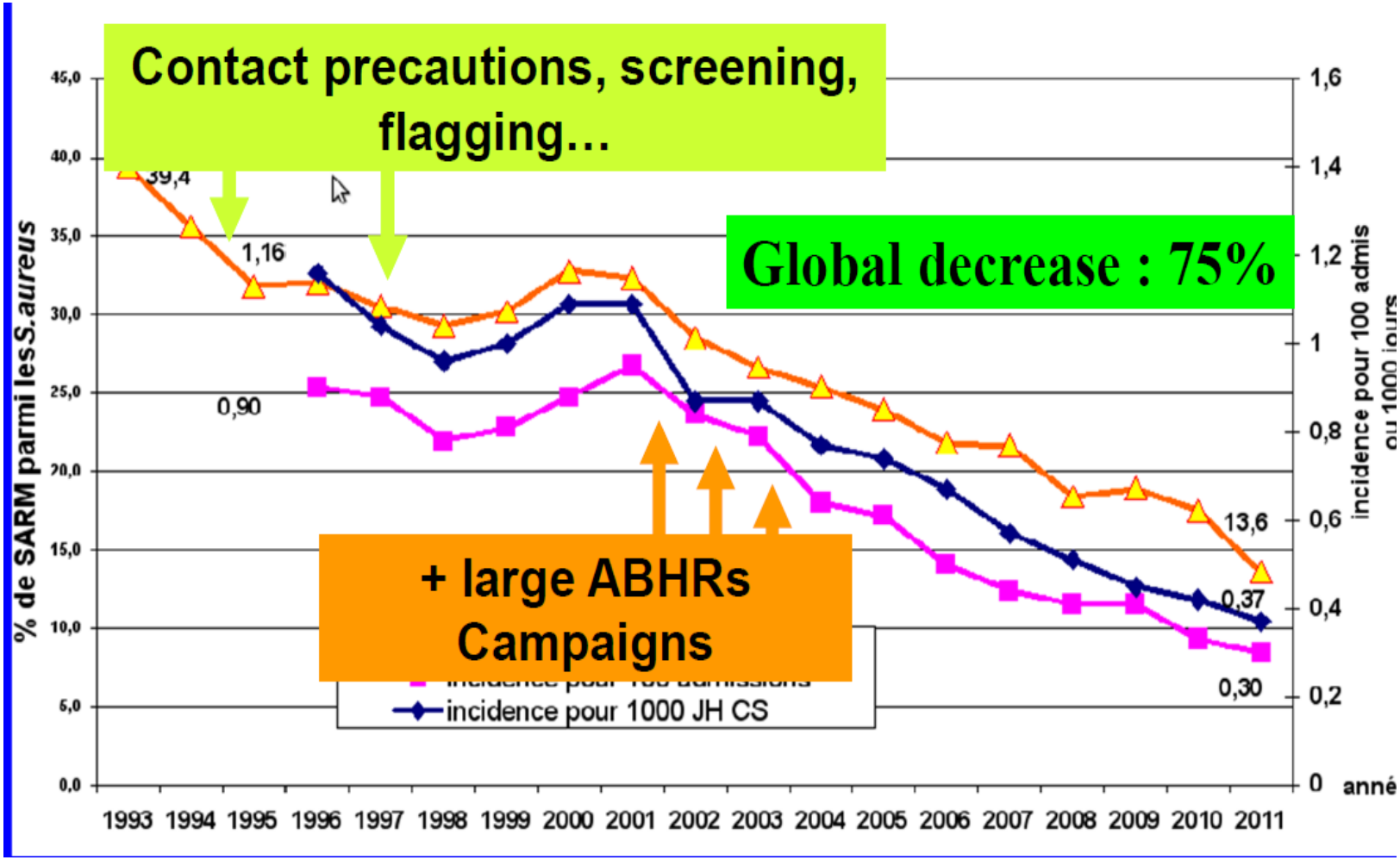
# % MRSA in S Aureus and MRSA incidence. Acute Care 38 univ in Paris (1993-2011)

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# Successful interventions in Adults

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

## Veterans Affairs Initiative to Prevent Methicillin-Resistant *Staphylococcus aureus* Infections

Rajiv Jain, M.D., Stephen M. Kralovic, M.D., M.P.H., Martin E. Evans, M.D.,

Aim: To reduce hospital-acquired infection rates with MRSA

Interventions:

1. Surveillance of nasal carriage with MRSA on admission, ward transfer and hospital discharge
2. Contact precautions for those colonized/infected with MRSA
3. Hand hygiene
4. Change in the institutional culture: "positive deviance"
   - To foster alterations in practice so that infection control and prevention become everyone's responsibility

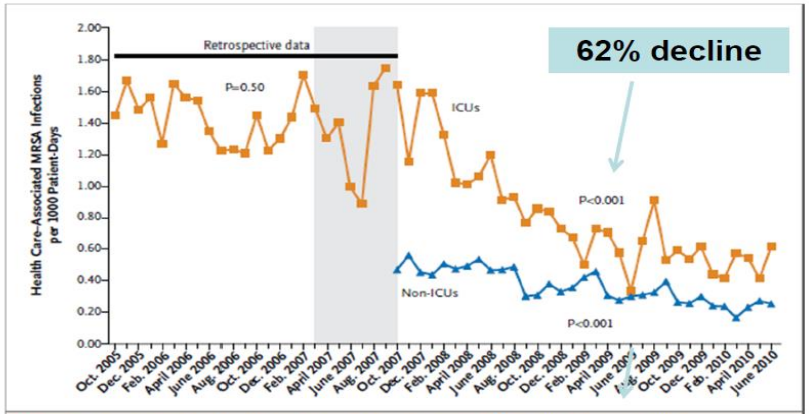



Figure 3. Nationwide Rates of Health Care–Associated Infections with Methicillin-Resistant *Staphylococcus aureus* (MRSA) in Veterans Affairs (VA) Facilities.

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.,

**Table 3. Frequency and Rates of Outcomes during the Baseline and Intervention Periods, According to Study Group.***

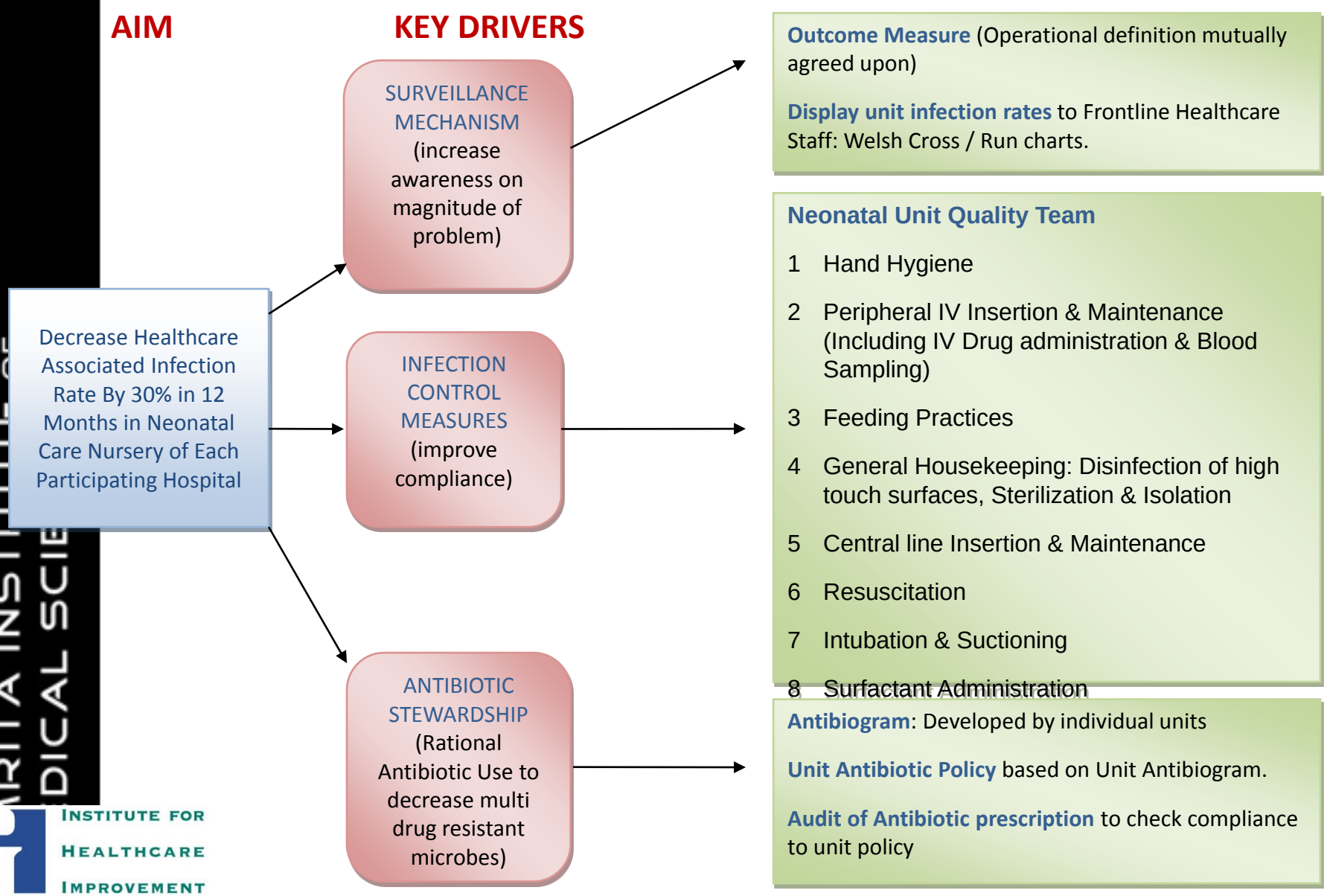
| Outcome | Group 1 | | Group 2 | | Group 3 | |
|---|---|---|---|---|---|---|
| | Baseline | Intervention | Baseline | Intervention | Baseline | Intervention |
| | *no. of events (crude rate per 1000 patient-days)* | | | | | |
| MRSA clinical cultures | 216 (3.4) | 279 (3.2) | 245 (4.3) | 301 (3.2) | 240 (3.4) | 217 (2.1) |
| Bloodstream infection | | | | | | |
| MRSA | 37 (0.6) | 63 (0.7) | 31 (0.5) | 61 (0.6) | 46 (0.6) | 48 (0.5) |
| Any pathogen† | 265 (4.2) | 360 (4.1) | 273 (4.8) | 341 (3.7) | 412 (6.1) | 356 (3.6) |
| Gram-positive organism | 165 (2.6) | 228 (2.6) | 159 (2.8) | 203 (2.2) | 253 (3.7) | 187 (1.9) |
| Skin commensal organism | 50 (0.8) | 55 (0.6) | 49 (0.9) | 46 (0.5) | 120 (1.8) | 38 (0.4) |
| Noncommensal organism | 115 (1.8) | 173 (2.0) | 110 (1.9) | 157 (1.7) | 133 (2.0) | 149 (1.5) |
| Gram-negative organism | 62 (1.0) | 83 (0.9) | 58 (1.0) | 75 (0.8) | 100 (1.5) | 107 (1.1) |
| Candida species | 38 (0.6) | 49 (0.6) | 56 (1.0) | 63 (0.7) | 59 (0.9) | 62 (0.6) |

This is the incidence of first episode of BSI. Formal analyses for first episode of MRSA and Gram-negatives are pending.

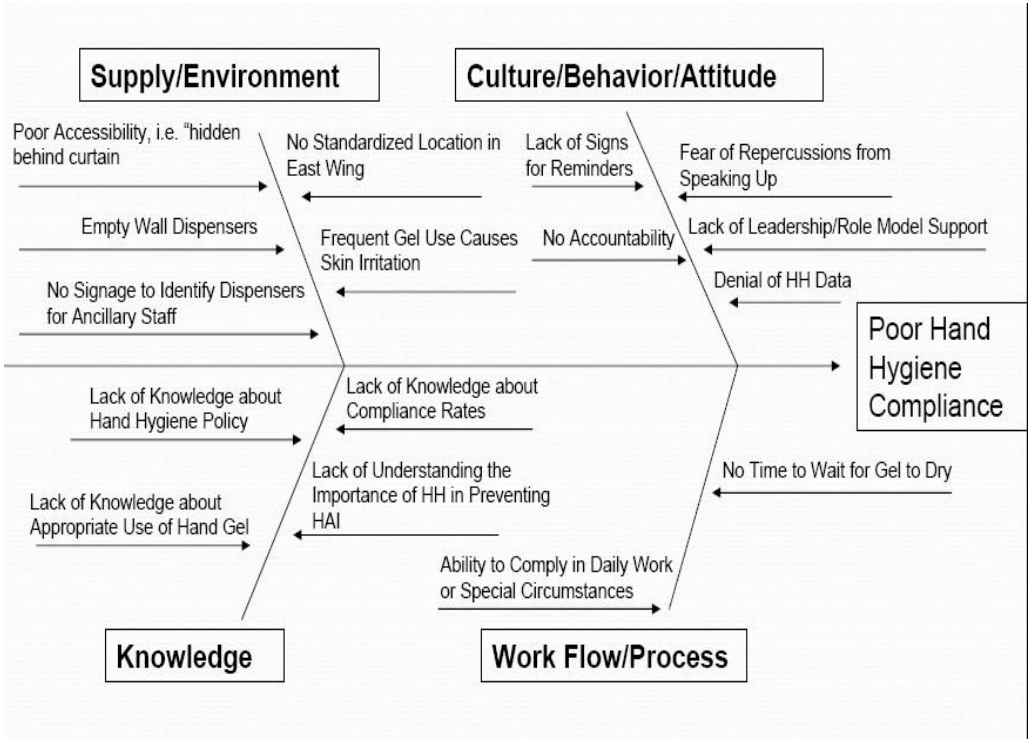
**Table S3. Bloodstream Pathogens by Study Arm in Baseline and Intervention Periods per 1,000 Attributable ICU Days [a]**

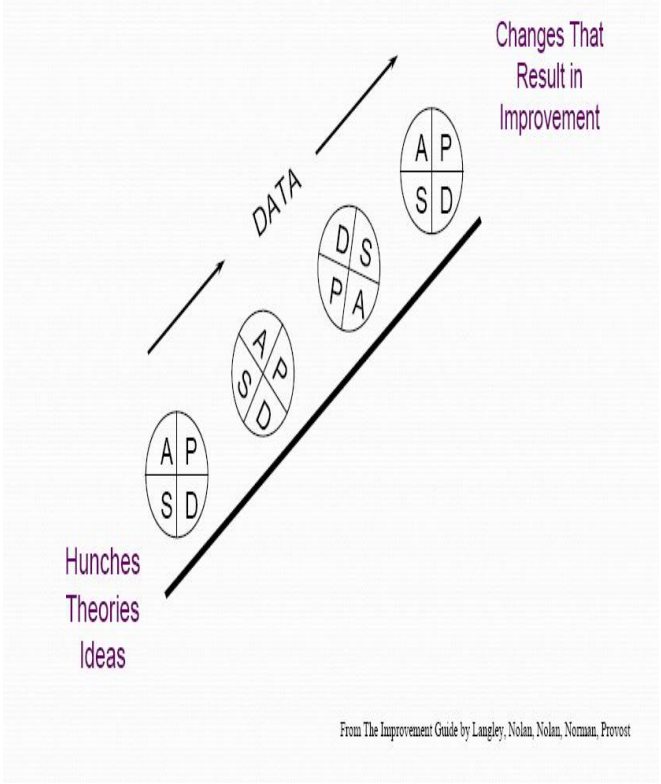
| Pathogen (Ordered by Frequency) | Bloodstream Infections per 1,000 Attributable ICU Days | | | | | |
|---|---|---|---|---|---|---|
| | Arm1 | | Arm 2 | | Arm 3 | |
| | Baseline | Intervention | Baseline | Intervention | Baseline | Intervention |
| **Total Events (N)** | **265** | **360** | **273** | **341** | **412** | **356** |
| ***Staphylococcus aureus* (N)** | 77 | 128 | 70 | 106 | 80 | 92 |
| Methicillin-Resistant (MRSA) | 0.46 | 0.49 | 0.47 | 0.56 | 0.58 | 0.38 |
| Methicillin-Susceptible (MSSA) | 0.77 | 0.97 | 0.75 | 0.59 | 0.61 | 0.54 |
| **Total** | **1.23** | **1.46** | **1.23** | **1.15** | **1.19** | **0.92** |
| **Coagulase-Negative *Staphylococcus*[b] (N)** | 48 | 54 | 43 | 42 | 116 [c] | 36 |
| **Total** | **0.77** | **0.62** | **0.75** | **0.46** | **1.72** | **0.36** |

# DRIVER DIAGRAM



# Outcome Measures & QI application




**Quality Indicators** @ IAQ; CSSD; Kitchen; Laundry; Labs; Blood Bank; ICUs; Water; Bone Marrow Tx; Pharmacy; Occupational Exposure; Vaccination; Outbreak Mgmt; BMW; Cost; Notifiable Disease

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# The Federal Needlestick Safety and Prevention Act – Law from Nov 2000

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# Dream Team

# Summary

- To adopt time tested models which have the largest impact
- Compendiums
- Collaborate and Research
- Engage with all stake holders
- Customised
- Infecteconomics & Quality initiatives

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# Thank You

**Its all in your hands !!!!**

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