

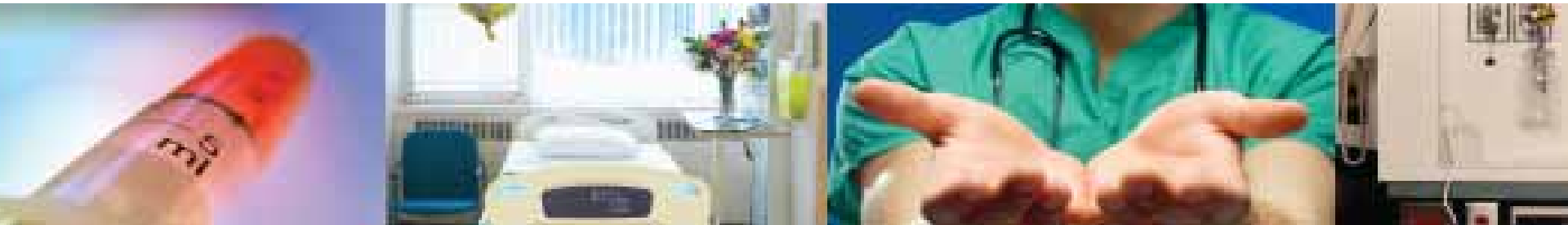
PUBLIC HEALTH GRAND ROUNDS

Office of the Director

October 15, 2009



Toward the Elimination of Healthcare-associated Infections



**National Center for Preparedness, Detection,
and Control of Infectious Diseases**



Outline

- ❑ **Presentation**: Chesley Richards, MD, MPH
Healthcare-associated Infections: A Primer
- ❑ **Focused Discussion**: P. J. Brennan, MD
Toward Elimination of Healthcare-associated Infections – the Pennsylvania Experience
- ❑ **Focused Discussion**: Barry Straube, MD
Healthcare-associated Infections: Strategies for Elimination



Healthcare-associated Infections: A Primer

- The Burden and Evidence for Prevention**
- National Implementation Activities**
- Program Role in HAI Elimination**
- Evaluation of Progress**



Healthcare-associated Infections (HAIs)

- ❑ **Definition:** Infections that patients acquire during the course of receiving treatment for other conditions within a healthcare setting

- ❑ **Settings:** hospitals (Intensive Care Units, Special Care Units, other hospital settings), long-term care facilities (LTCFs), outpatient facilities such as ambulatory surgical clinics, dialysis centers

- ❑ **In hospitals alone (annually)**
 - 1.7 million HAIs
 - 1 out of 20 patients (5%) acquire an HAI
 - 99,000 deaths associated with HAIs
 - \$26-33 billion in excess healthcare costs



Estimates of Healthcare-associated Infections in US Hospitals Annually

	Number of Infections	National Cost Billion \$	Deaths
Device-related infections			
Urinary tract infections	560,000	0.4-0.5	8,000
Bloodstream infections	250,000	2-8	31,000
Pneumonia	250,000	5-7	36,000
Procedure-related infections			
Surgical site infections	290,000	3-8	13,000



Healthcare-associated Infections in Non-hospital Settings

❑ Long-term care

- 1.7 million beds with 2.5 million residents/year nationally
- Veterans Healthcare System: 133 LTCFs, 11,475 residents
 - ✓ HAI prevalence: 5.2%
 - ✓ Indwelling medical device: 25% of all residents

❑ Ambulatory surgical centers: 5,175 facilities

- Data on HAIs from outbreaks; no national surveillance
- Example: hepatitis C outbreak associated with syringe reuse resulted in letters to > 40,000 endoscopy center patients

❑ Dialysis centers: 4,950 facilities

- Catheter-related bloodstream infections: 4.2 per 100 patient months
- Incidence of methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infection: 100 x greater than in nondialysis population

MRSA Infections Are a Patient Safety Challenge not Limited to Acute Care Hospital Setting

ORIGINAL CONTRIBUTION

JAMA[®]

Invasive Methicillin-Resistant *Staphylococcus aureus* Infections in the United States

R. Monina Kleven, DDS, MPH

Melissa A. Morrison, MPH

Joelle Nadle, MPH

Susan Petit, MPH

Ken Gershman, MD, MPH

Susan Ray, MD

Lee H. Harrison, MD

Ruth Lznfeldt, MD

Chinwa Dumyati, MD

John M. Townes, MD

Allen S. Craig, MD

Elizabeth R. Zell, MSTAT

Gregory E. Fosheun, MPH

Linda K. McDougal, MS

Roberta B. Carey, PhD

Scott K. Fridkin, MD

For the Active Bacterial Core

surveillance (ABC) MRSA

Investigators

AFTER BEING INITIALLY reported among injecting drug users in Detroit in 1981¹ and others associated with the deaths of 4 children in Minnesota and North Dakota in 1997,² community-associated methicillin-resistant *Staphylococcus aureus* (MRSA) has become the most frequent cause of skin and soft tissue infections presenting to emergency departments in the United States.³ Although community outbreaks of MRSA in diverse populations, including American Indian and Alaska Natives,⁴ sports

See also p 1803 and Patient Page.

Context As the epidemiology of infections with methicillin-resistant *Staphylococcus aureus* (MRSA) changes, accurate information on the scope and magnitude of MRSA infections in the US population is needed.

Objectives To describe the incidence and distribution of invasive MRSA disease in 9 US communities and to estimate the burden of invasive MRSA infections in the United States in 2005.

Design and Setting Active, population-based surveillance for invasive MRSA in 9 sites participating in the Active Bacterial Core surveillance (ABCs)/Emerging Infections Program Network from July 2004 through December 2005. Reports of MRSA were investigated and classified as either health care-associated (either hospital-onset or community-onset) or community-associated (patients without established health care risk factors for MRSA).

Main Outcome Measures Incidence rates and estimated number of invasive MRSA infections and in-hospital deaths among patients with MRSA in the United States in 2005; interval estimates of incidence excluding 1 site that appeared to be an outlier with the highest incidence; molecular characterization of infecting strains.

Results There were 8987 observed cases of invasive MRSA reported during the surveillance period. Most MRSA infections were health care-associated: 5250 (58.4%) were community-onset infections, 2389 (26.6%) were hospital-onset infections; 1234 (13.7%) were community-associated infections, and 114 (1.3%) could not be classified. In 2005, the standardized incidence rate of invasive MRSA was 31.8 per 100 000 (interval estimate, 24.4–35.2). Incidence rates were highest among persons 55 years and older (127.7 per 100 000; interval estimate, 92.6–156.9), blacks (66.5 per 100 000; interval estimate, 43.5–83.1), and males (37.5 per 100 000; interval estimate, 26.8–39.5). There were 1598 in-hospital deaths among patients with MRSA infection during the surveillance period. In 2005, the standardized mortality rate was 6.3 per 100 000 (interval estimate, 3.3–7.5). Molecular testing identified strains historically associated with community-associated disease outbreaks recovered from cultures in both hospital-onset and community-onset health care-associated infections in all surveillance areas.

Conclusions Invasive MRSA infection affects certain populations disproportionately. It is a major public health problem primarily related to health care but no longer confined to intensive care units, acute care hospitals, or any health care institution.

JAMA. 2007;298(15):1763–1771

www.jama.com

Author Affiliations: Centers for Disease Control and Prevention, Atlanta, Georgia (Dr Kleven, Carey, and Fridkin and Ms Morrison, Zell, and McDougal) and Dr Fosheun); California Emerging Infections Program, Oakland (Ms Nadle); Connecticut Department of Health, Hartford (Dr Petit); Colorado Emerging Infections Program, Denver (Dr Gershman); Grady Memorial Hospital, Atlanta (Dr Ray); Maryland Emerging Infections Program and Johns Hopkins Bloomberg School of Public Health, Baltimore (Dr Harrison); Minnesota Department of Health, Minneapolis (Dr

Lynfield); University of Rochester, Rochester General Hospital, Rochester, New York (Dr Dumyati); Oregon Health & Science University, Portland (Dr Townes); and Tennessee Department of Health, Nashville (Dr Craig).
The ABCs MRSA Investigators are listed at the end of this article.
Corresponding Author: R. Monina Kleven, DDS, MPH, Division of Healthcare Quality Promotion, Centers for Disease Control and Prevention, 1600 Clifton Rd (A-24), Atlanta, GA 30333 (mk2@cdc.gov).

©2007 American Medical Association. All rights reserved.

(Reprinted) JAMA, October 31, 2007—Vol 298, No. 15 4763

□ ~ 100,000 invasive MRSA infections per year (normally sterile site)

□ 25% was “nosocomial”

□ 60% identified before or in first 2 days of hospitalization (but with contacts to healthcare settings)

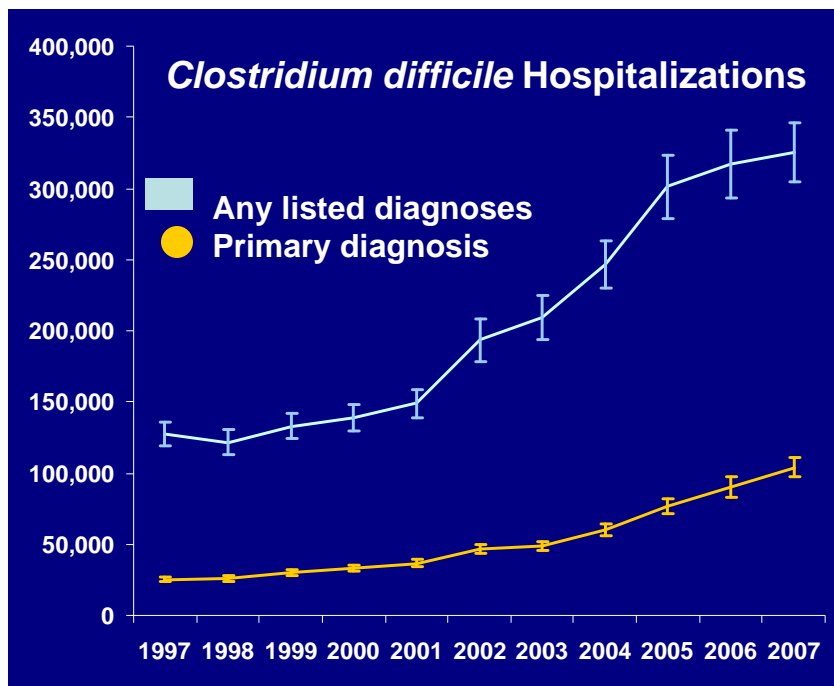
Healthcare-associated community-onset

□ 15% community-associated



Emerging Threats in Healthcare

Estimate of *Clostridium difficile* Cases, by Setting

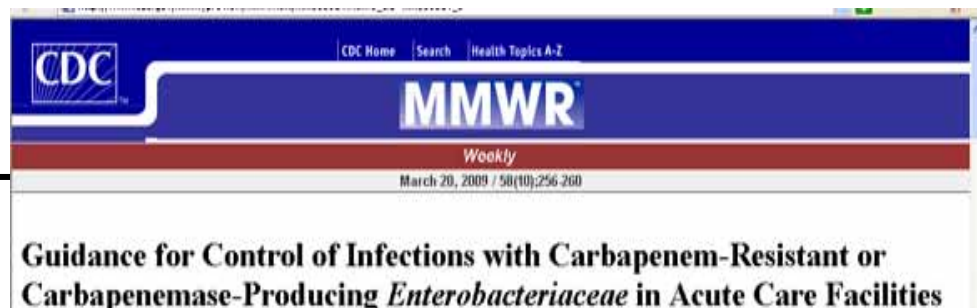


- ❑ **Hospital-acquired, hospital-onset cases**
 - 165,000, \$1.3 billion in excess costs, and 9,000 deaths annually
- ❑ **Hospital-acquired, post-discharge (up to 4 weeks)**
 - 50,000, \$0.3 billion in excess costs, and 3,000 deaths annually
- ❑ **Nursing home-onset cases**
 - 263,000, \$2.2 billion in excess costs, and 16,500 deaths annually

% Gram Negative Bacteria Resistant to Key Drugs by Healthcare-associated Infection Type

Source: National Healthcare Safety Network

Organism	Bloostream infection	Pneumonia	Urinary tract infection
<i>Acinetobacter baumannii</i>			
Carbapenem resistant (%)	29	37	26
<i>Klebsiella pneumoniae</i>			
Cef/Ctr resistant (%)	27	24	21
Carbapenem resistant (%)			



State of Prevention Knowledge/Science

HICPAC/CDC Evidence-based Prevention Recommendations

- ❑ **Guidelines are developed for each type of infection and based on systematic reviews of the medical literature**
- ❑ **Categories of Evidence**
 - **Category 1A**
 - ✓ **Strong recommendation/strong or moderate quality of evidence**
 - **Category 1B**
 - ✓ **Strong recommendation/weak quality of evidence or accepted practices**
 - **Category 1C**
 - ✓ **Strong recommendation required by state or federal regulation**
 - **Category 2**
 - ✓ **Weak recommendation supported by limited evidence**
 - **No recommendation/unresolved issue**
 - ✓ **Insufficient evidence to support a recommendation**

State of Prevention Knowledge/Science

Suboptimal Adherence to HICPAC/CDC Recommendations

- ❑ **Hand hygiene adherence**
 - **5% - 81% (overall average: 40%)**

- ❑ **Surgical antimicrobial prophylaxis**
 - **<50% adherence to recommendations**

- ❑ **Full compliance with major HAI guidelines**
 - **Among 1,256 US hospitals—30.7% to 38.5%**
 - **Central-line bloodstream infections prevention—35.4%**

State of Prevention Knowledge/Science

Successful Prevention of Bloodstream Infections Michigan & Pennsylvania

- ❑ **Implementation of CDC/HICPAC Bloodstream Infection Prevention Guideline**
 - For insertion and removal of intravascular catheters
- ❑ **Intensive care units**
 - SW Pennsylvania (66), Michigan (103)
- ❑ **Interventions to increased adherence to recommendations were similar**
 - Education of staff
 - Creation of a central-line cart
 - Data/feedback on adherence to practices and outcomes
 - Daily multidisciplinary rounds
 - Strategies to improve safety culture

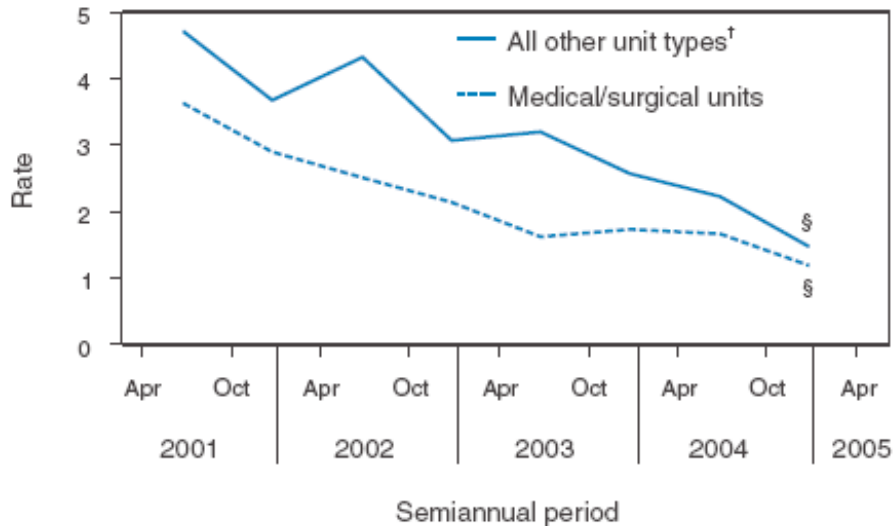


State of prevention Knowledge/Science

Successful Implementation of HICPAC/CDC Guidelines Prevents Bloodstream Infections

Pennsylvania

FIGURE. Central line-associated bloodstream infection rate* in 66 intensive care units (ICUs), by ICU type and semiannual period — southwestern Pennsylvania, April 2001–March 2005



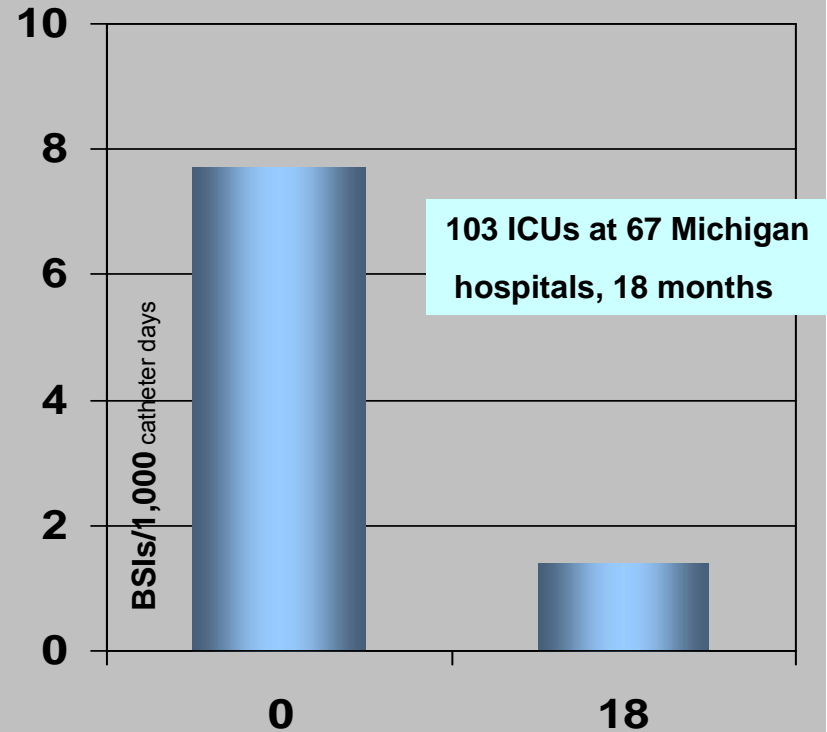
* Pooled mean rate per 1,000 central line days.

† Includes cardiothoracic, coronary, surgical, neurosurgical, trauma, medical, burn, and pediatric ICUs.

§ p<0.001.

MMWR 2005;54:1013-16

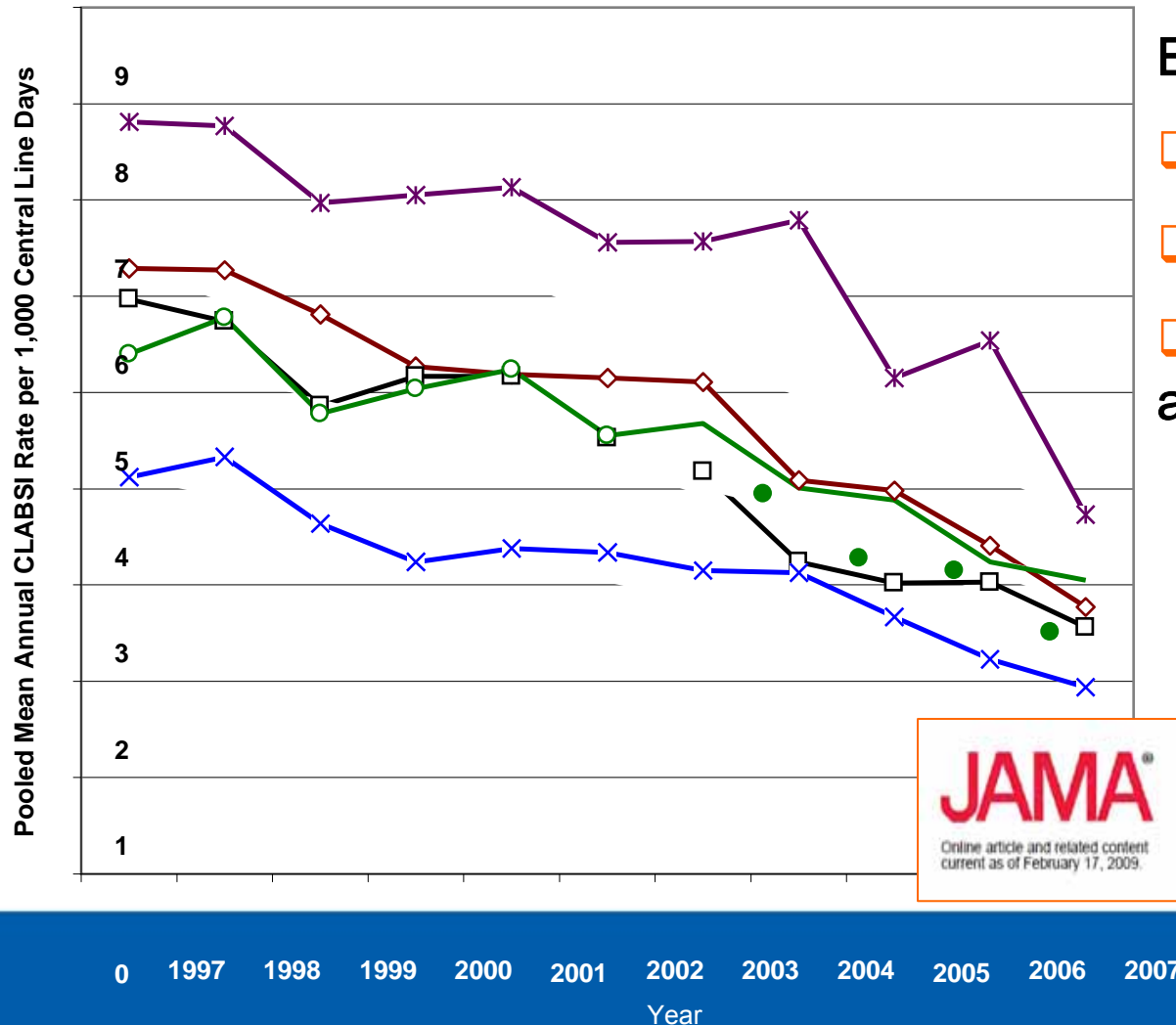
Michigan



Pronovost P. New Engl J Med 2006;355:2725-32

Trends in MRSA Bloodstream Infections by ICU Type

National Healthcare Safety Network Hospitals, 1997-2007



Estimated:

- 7,000 BSIs prevented
- 1,800 lives saved
- \$50-180M in costs averted annually

JAMA[®]

Online article and related content
current as of February 17, 2009.

**Methicillin-Resistant Staphylococcus aureus Central
Line Associated Bloodstream Infections in US Intensive
Care Units, 1997-2007**

Deron C. Burton; Jonathan R. Edwards; Teresa C. Horan; et al.

JAMA. 2009;301(7):727-736 (doi:10.1001/jama.2009.153)

0 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007

Year



Preliminary Estimates of Preventable Infections, Deaths, and Costs

Based on Published Literature

Type of healthcare- associated infection	Preventable			Cost avoided (billions of 2009 dollars)
	Fraction	Infections (thousands)	Deaths (thousands)	
Bloodstream infection	18%–66%	45-164	6-20	1-18
Pneumonia	38%–55%	95–138	14–20	2-3
Urinary tract infection	17%–69%	95–388	2–9	0.1-2
Surgical site infection	26%–54%	75–157	2–4	0.2-0.3

Healthcare-associated Infections: A Primer

- ❑ The Burden and Evidence for Prevention
- ❑ National Implementation Activities
- ❑ Program Role in HAI Elimination
- ❑ Evaluation of Progress



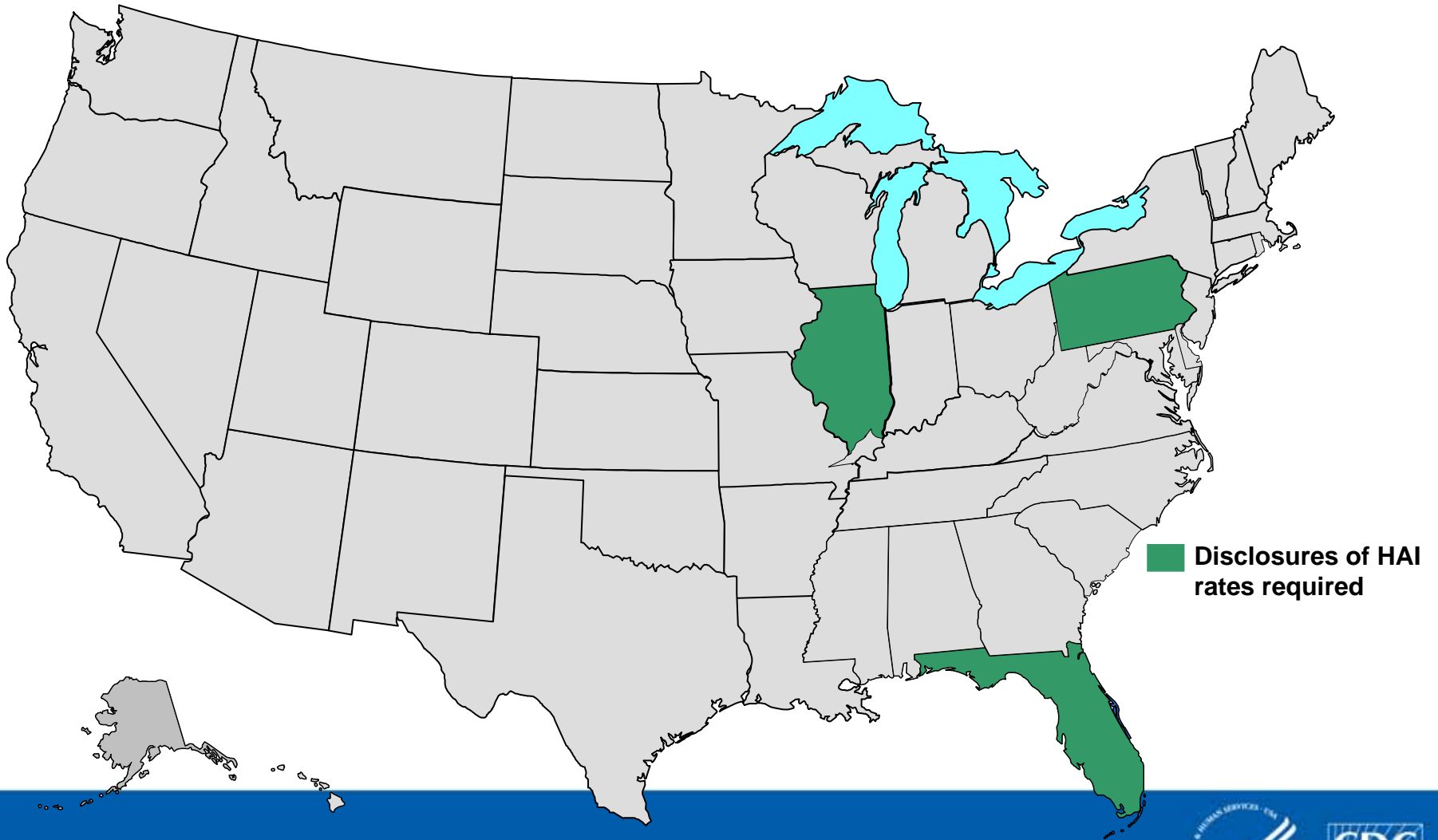
Keys for the Elimination of Healthcare-associated Infections

- ❑ **Data for action**
- ❑ **Improved implementation of existing best practices**
- ❑ **Recognize excellence in prevention**
- ❑ **Address gaps in knowledge**
- ❑ **Identify and respond to emerging threats**



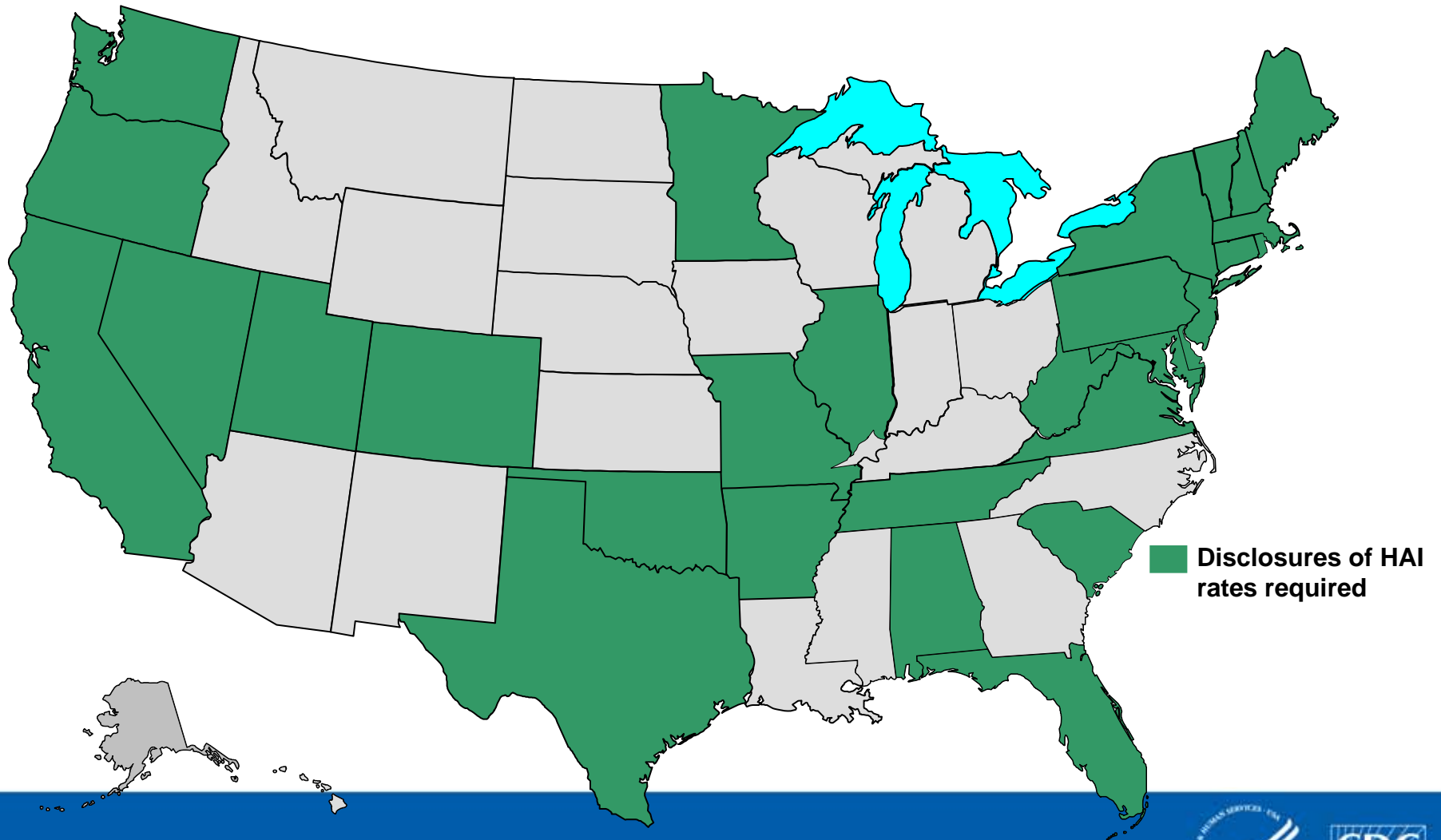
Data for Action

State Initiatives: Public Reporting of HAIs, 2004



Data for Action

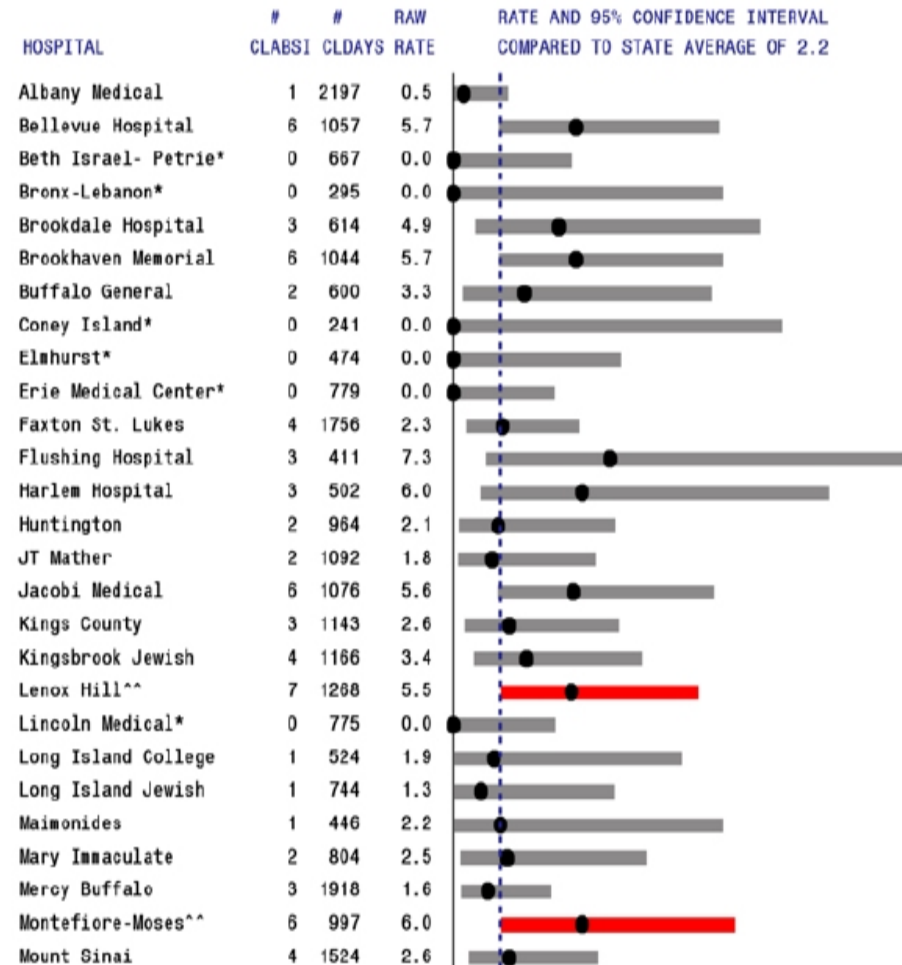
State Initiatives: Public Reporting of HAIs, 2009



Data for Action

Healthcare-associated Infections in New York State, 2008 A State Report Utilizing CDC's National Healthcare Safety Network

Figure XXIV - Central Line-Associated Blood Stream Infection (CLABSI) Rates, Coronary Intensive Care Units, New York State 2008 (page 1 of 2)



Report includes

- Bloodstream infections in intensive care unit (ICU) patients
- Surgical site infections

From 2007 to 2008

- Bloodstream infection rates increasing
- Surgical site infection rates decreasing
- Targeted prevention efforts

Improved Implementation of Existing Best Practices

2009 HHS Action Plan in Response to GAO



News Release

FOR IMMEDIATE RELEASE
Tuesday, January 6, 2009

Contact: OPHS Press Office
(202) 205-0143

HHS Issues Action Plan to Prevent Health Care-Associated Infections

The U.S. Department of Health and Human Services (HHS) unveiled a plan that establishes a set of five-year national prevention targets to reduce and possibly eliminate health care-associated infections (HAIs).

Health care-associated infections are infections that patients acquire while undergoing medical treatment or surgical procedures. These infections are largely preventable.

The Action Plan to Prevent Health Care-Associated Infections lists a number of areas in which HAIs can be prevented, such as surgical site infections. The plan also outlines cross-agency efforts to save lives and reduce health care costs through expanded HAI prevention efforts.

"This plan will serve as our roadmap on how the department addresses this important public health and patient safety issue," HHS Secretary Mike Leavitt said. "This collaborative interagency plan will help the nation build a safer, more affordable health care system."

The plan establishes national goals and outlines key actions for enhancing and coordinating HHS-supported efforts. These include development of national benchmarks prioritized recommended clinical practices, a coordinated research agenda, an integrated information systems strategy and a national messaging plan.

The plan also identifies opportunities for collaboration with national, state, tribal and local organizations.

HHS intends to update the plan in response to public input and new recommendations for infection prevention. The plan, and instructions for submitting comments on the plan, can be found online at <http://www.hhs.gov/ophs>.



HHS Action Plan for HAI Prevention

National 5 Year Goals

Metric	Source	National 5-Year Prevention Target	Coordinator
Bloodstream infections	NHSN	50% reduction	CDC
Adherence to central-line insertion practices	NHSN	100% adherence	CDC
<i>Clostridium difficile</i> (hospitalizations)	NHDS HCUP	30% reduction	CDC/AHRQ
<i>Clostridium difficile</i> infections	NHSN	30% reduction	CDC
Urinary tract infections	NHSN	25% reduction	CDC
MRSA invasive infections (population)	EIP	50% reduction	CDC
MRSA bacteremia (hospital)	NHSN	25% reduction	CDC
Surgical site infections	NHSN	25% reduction	CDC
Surgical Care Improvement Project Measures	SCIP	95% adherence	CMS

NHSN=National Healthcare Safety Network NHDS=National Hospital Discharge Survey
 HCUP=Healthcare Cost and Utilization Project EIPs=Emerging Infections Program
 SCIP=Surgical Care Improvement Project



Recognize Excellence in Prevention

❑ Congress: Health Reform

- Health reform bills propose mandatory national public reporting
- HAI prevention would be tied to Medicare/Medicaid payment

❑ Centers for Medicare and Medicaid Services (CMS)

- Reduced payment for hospital-acquired conditions (HACs) including healthcare-associated infections
 - ✓ Effective October 2008
 - ✓ Includes hospital-associated bloodstream infections, urinary tract infections, and selected surgical site infections
- Pay for reporting/performance



Healthcare-associated Infections: A Primer

- ❑ The Burden and Evidence for Prevention
- ❑ National Implementation Activities
- ❑ Program Role in HAI Elimination
- ❑ Evaluation of Progress



CDC's Role in HAI Elimination

Data for Action

❑ National Healthcare Safety Network (NHSN)

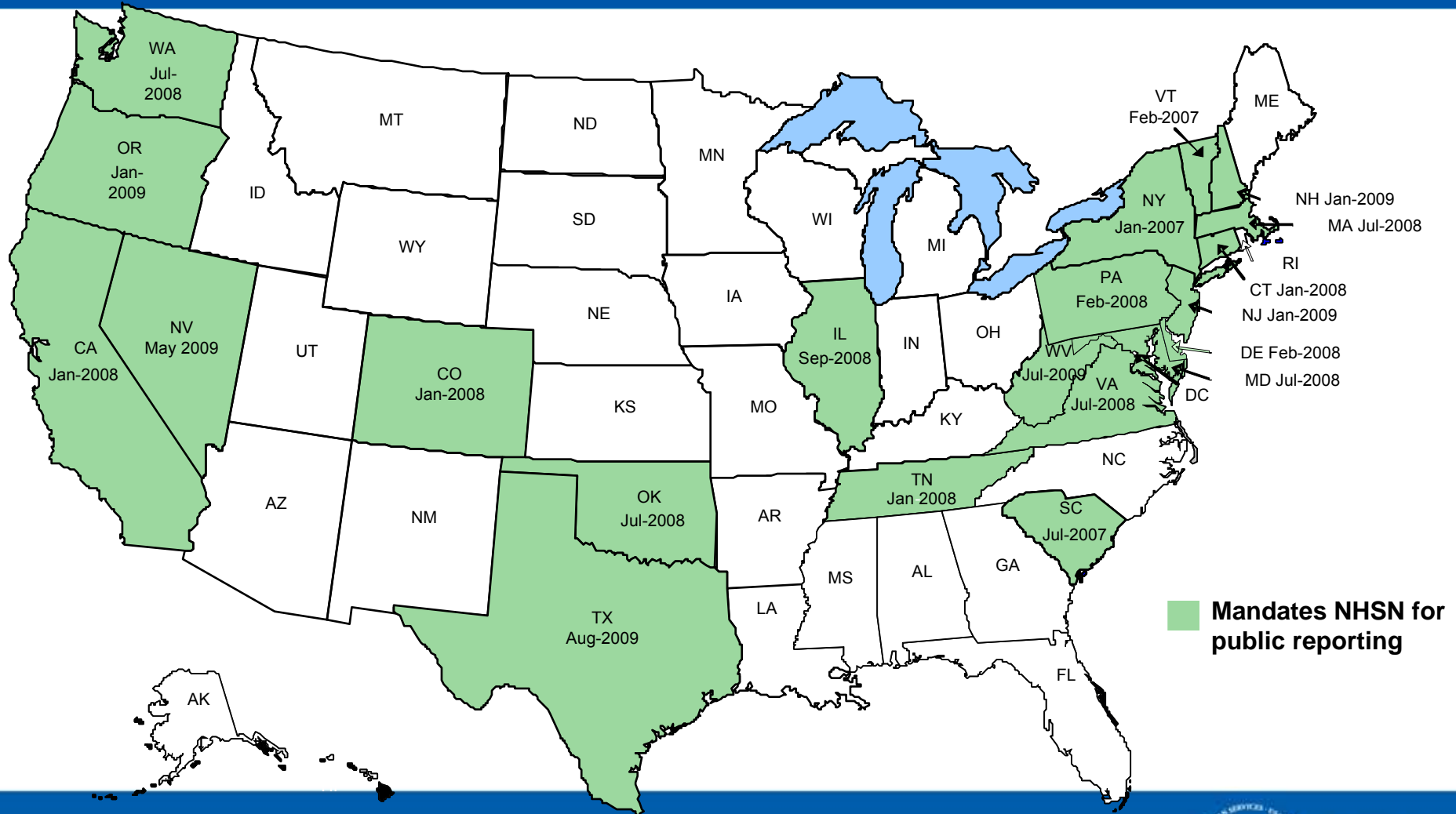
- Internet based reporting system through CDC's Secure Data Network
- 2400+ US healthcare facilities currently participate from all 50 states
- Standard definitions, methods, and protocols
 - ✓ used in more than 20 countries
- Manual data entry with transition toward electronic data capture

❑ Emerging Infections Program

- Population based surveillance in 10 states
- Especially important for understanding the dynamic epidemiology of healthcare-associated infections due to MRSA and *C. difficile*, and other emerging multidrug resistant bacteria causing HAIs

CDC's Role in HAI Elimination

Data for Action: States Mandating NHSN for Reporting (in green)



CDCs Role in HAI Elimination

CDC Support for State Activities

❑ **Congressionally mandated State HAI Plans**

- **States will be required to have a formal HAI prevention plan**
- **Linked to CDCs Prevention Block Grant**
- **Submission to HHS by January 1, 2010**

❑ **Recovery Act**

- **\$40M to CDC to fund State HAI activities**
 - ✓ **All grantees will be developing and executing State HAI Plans based on the HHS Action Plan - 49 states, DC, and Puerto Rico funded**
 - ✓ **Enhancing HAI surveillance**
 - ✓ **Establishing HAI prevention initiatives**
- **\$10M to CMS to improve surveys in ambulatory surgical clinics**
 - ✓ **CDC assisting by developing tools for enhanced surveys, training surveyors, and assisting with onsite survey activities**



CDC's Role in HAI Elimination

Address Emerging Threats and Gaps in Knowledge

□ Prevention

- **Better understanding of HAI epidemiology: New risk factors, populations, impact on patient outcomes and healthcare costs to prioritize prevention practice development**
- **New evidence-based prevention practices, or combinations of existing practices**
- **Comparative effectiveness studies where multiple, competing prevention measures co- exist**
- **Improve process and outcomes data for HAI reporting and prevention**

□ Microbiology

- **Antimicrobial resistance: Methods and molecular epidemiology of emerging pathogens**
- **Environmental microbiology: Role of the healthcare environment in infection transmission**



Healthcare-associated Infections: A Primer

- ❑ **The Burden and Evidence for Prevention**
- ❑ **National Implementation Activities**
- ❑ **Program Role in HAI Elimination**
- ❑ **Evaluation of Progress**



Evaluation of Progress Toward Eliminating HAIs

- ❑ **Primary outcome - Have HAIs been reduced or eliminated?**
 - **Ultimate goal is to have sustained action to prevent infections**
- ❑ **Challenge for primary outcome measure**
 - **Infection rates vary by healthcare setting, intervention, risk group**
 - **Great desire to have simple metrics, that can be used at the unit, hospital, state, national level**
- ❑ **Standardized Infection Ratio (SIR)**
 - **Analogous to a Standardized Mortality Ratio**
 - **Compares each unit, hospital, state to a baseline rate (2006-2008)**
 - **Allows combining of data from a variety of healthcare settings**
- ❑ **Publicly reported SIRs by State, January 2010**



Evaluation of Progress Toward Eliminating HAIs

Standardized Infection Ratios (SIR), by State

State	SIR	Central Line-Days	% Hospitals Participating	% Data from Intensive Care Units
A	0.85	174,082	24.7	73.2
B	0.92	163,314	61.4	93.7
C	1.16	94,455	70.8	59.5
D	1.30	95,288	65.8	93.6

 Significantly below

 Below

 Above

 Significantly above

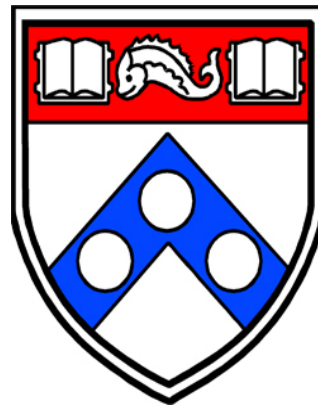
Focused Discussion

P. J. Brennan, MD

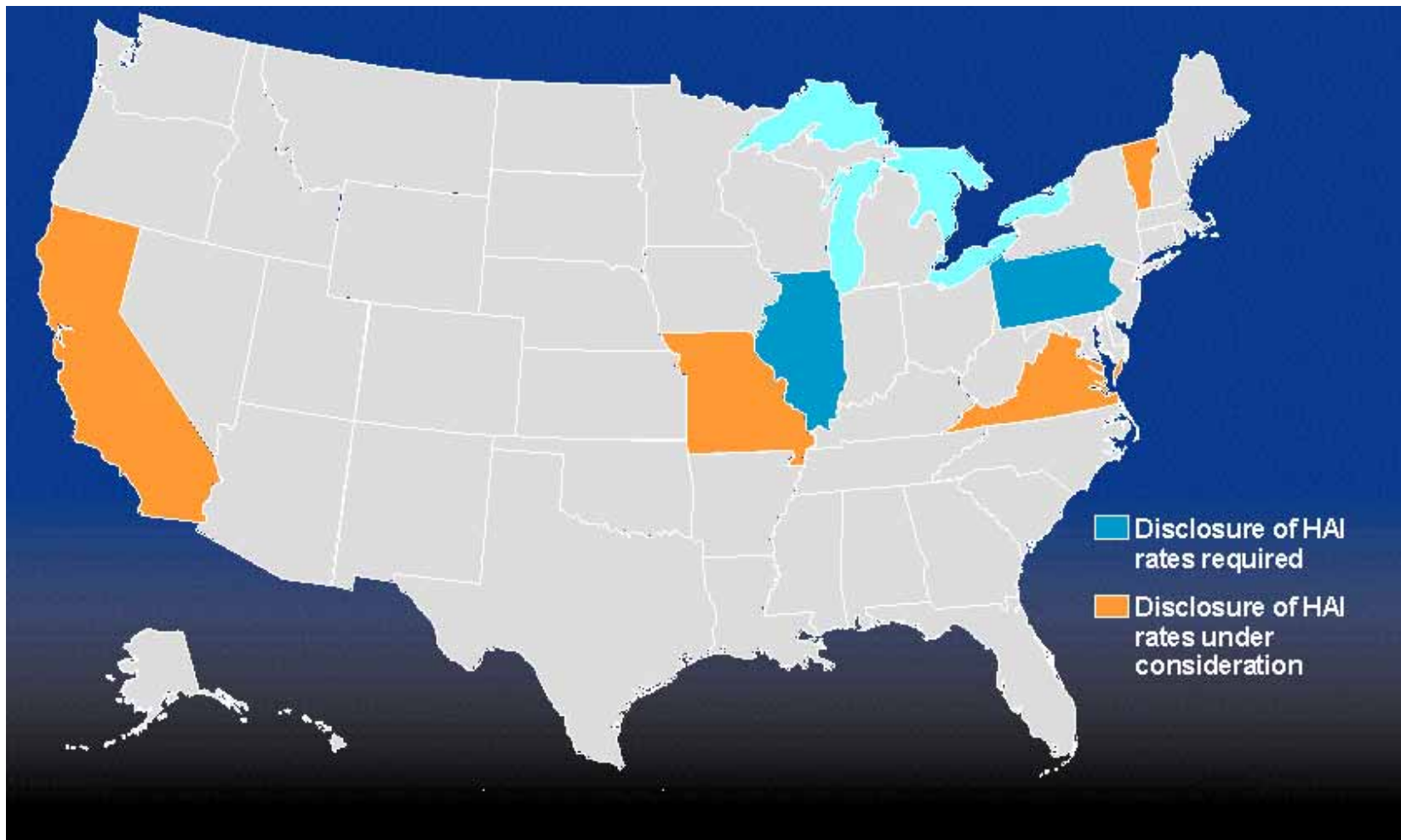
Chair, HICPAC

Chief Medical Officer, University of Pennsylvania

***Toward Elimination of Healthcare Associated Infections –
the Pennsylvania Experience***



Public Disclosure of Healthcare Acquired Infection (HAI) Rates



October 4, 2004 Pittsburgh Business Journal

Hospitals Underreport Infection Rates

Lynne Glover

New data suggests Pennsylvania hospitals are failing to report thousands of hospital-acquired infections, as required by law. Starting in January, hospitals were required to begin reporting four types of hospital-acquired infections to the Pennsylvania Health Care Cost Containment Council: blood stream infections, urinary track infections, surgery site infections and ventilator-associated pneumonia. First-quarter data became available last month and showed approximately 2,300 such infections. mandated.

The bottom line The Pittsburgh Regional Healthcare Initiative, a nonprofit organization founded five years ago in an effort to improve patient care, has been collecting infection data voluntarily from about two dozen Western Pennsylvania hospitals since 2001.



Hospital-acquired Infections in Pennsylvania

In January 2004, Pennsylvania hospitals began submitting data on hospital-acquired infections to the Pennsylvania Health Care Cost Containment Council (PHC4). While concerns remain about whether all hospitals are fully complying with this new initiative, the first year of data collected provides some eye-opening information for all parties involved in the delivery and payment of hospital care. In 2004, hospitals reported 11,668 hospital-acquired infections, that is, 7.5 hospital-acquired infections per 1,000 patients admitted to Pennsylvania's general acute care hospitals. 15.4 percent or 1,793 of these patients died. \$2 billion in additional hospital charges and 205,000 additional hospital days were associated with the hospital admissions in which these devastating infections occurred. However, until all Pennsylvania hospitals have met the current PHC4 reporting requirements for hospital-acquired infection data, the full impact of these infections remains unknown.

PHC4's Call to Action

Early last year, the Pennsylvania Health Care Cost Containment Council (PHC4) began collecting information on

infections that patients contract while in the hospital, a general finding that has been well-documented. This new initiative, which began January 1, 2004, is an important step toward ensuring that patients receive the highest quality of care possible. Hospital-acquired infections, which can result in complications, prolonged hospital stays, increased costs, and death. This data collection effort is designed to assist in the effort to reduce the number of these infections by providing more accurate data to providers, patients, and consumers of health care.

The United States has seen an increase in hospital-acquired infections in recent decades. A

review published in the *New England Journal of Medicine* cited several studies reporting national estimates. Between 1975 and 1995, the incidence of hospital-acquired infections per 1,000 bed days increased by 50.2 percent. The authors noted that "these alone would affect approximately 2 million patients each year in the United States and result in over 50,000 deaths." In 2004, there was 1.9 million admissions to Pennsylvania hospitals. This end-year figure on the 11,668 admissions to 173 general acute care hospitals. These hospitals reported 11,668 hospital-acquired infections to PHC4.

Issue No. 5 • July 2005



Hospital-acquired Infections in Pennsylvania

In January 2004, Pennsylvania hospitals began submitting data on hospital-acquired infections to the Pennsylvania Health Care Cost Containment Council (PHC4). While concerns remain about whether all hospitals are fully complying with this new initiative, the first year of data collected provides some eye-opening information for all parties involved in the delivery and payment of hospital care. In 2004, hospitals reported 11,668 hospital-acquired infections, that is, 7.5 hospital-acquired infections per 1,000 patients admitted to Pennsylvania's general acute care hospitals. 15.4 percent or 1,793 of these patients died. \$2 billion in additional hospital charges and 205,000 additional hospital days were associated with the hospital admissions in which these devastating infections occurred. However, until all Pennsylvania hospitals have met the current PHC4 reporting requirements for hospital-acquired infection data, the full impact of these infections remains unknown.

Distribution of HAIs by Sites as Reported by Pennsylvania Hospitals

Type of Infection	Number of Hospital-acquired Infections Reported by Hospitals
Surgical Site	1,317
Urinary Tract	6,139
Pneumonia	1,335
Bloodstream	1,932
Multiple Infections	945
Total	11,668



The Philadelphia Inquirer

Posted on Wed, Jul. 13, 2005

Hospital-infections analysis a first

A Pennsylvania report found patients spent 205,000 extra days in the hospital at a cost of \$350 million due to clinic-acquired diseases.

By Josh Goldstein
Inquirer Staff Writer

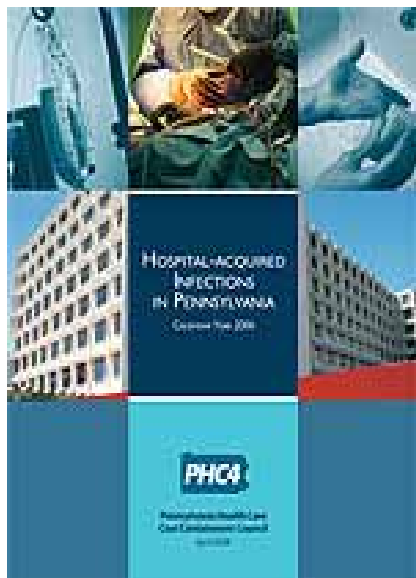
In 2004, 11,668 Pennsylvania hospital patients got an infection during their treatment causing them to spend an estimated 205,000 extra days in hospitals, according to a new report by a state agency.

The Pennsylvania Health Care Cost Containment Council's first report on hospital-acquired infections estimated that the sometimes preventable complications added nearly \$350 million to the cost of care last year.

The report examined more than 1.5 million admissions to hospitals. It found that 1,793 patients who contracted hospital-acquired infections died. According to the cost containment council, that was 1,510 more deaths than expected.



PHC4 2006 Report



Healthcare-related Infection

	<u>Yes</u>	<u>No</u>
Number	30,237	1,500,000
Fatal	12.3%	2.1%
LOS (days)	19.3	4.4
Charge*	\$176,000	\$33,000

* Charges are not costs

Difference: 3,084 deaths and \$4.3 billion



Hospital infections' cost tallied

In a first, a report broke down 19,154 cases in Pa. last year.

By Josh Goldstein
INQUIRER STAFF WRITER

Jeanne Stagloff expected that the surgery to repair a tear in her right knee would have her back on the ski slopes in no time.

But soon after her operation in February, the 56-year-old tax accountant developed an infection. As a result, Stagloff needed two additional operations, eight days in a Montgomery County hospital, and more than six months of rehabilitation.

Each year, thousands of patients contract infections in hospitals, a problem detailed for the first time yesterday in a report surveying 168 Pennsylvania hospitals.

Last year, 19,154 patients in Pennsylvania were infected in a hospital — driving up health-care costs, lengths of hospital stays, and death rates, the report said. The study examined 1.6 million hospitalizations.

The report, from the Pennsylvania Health Care Cost Containment Council, is the first in the country that allows people to examine infection rates hospital by hospital.

"The simple fact is that every patient that enters a hospital is at risk for a hospital-acquired infection," said Marc P. Volavka, executive director of the See **INFECTIONS** on A12

Hospital-Acquired Infections in the Region

All hospitals in Pennsylvania reported the number of patients who got infections during their care. Experts caution that it is difficult to compare hospitals because some that are very good at

identifying hospital-acquired infections may appear to have higher rates. The report grouped hospitals by the complexity of the care they provided.

The following 11 hospitals were considered to be top-tier:

Hospital	Infections		Deaths from infections		Hospital stay	
	Number	Rate per 1,000 patients	Number	Pct.	Length (days)	Average charges
Abington Memorial	529	16.4	51	9.6	17.3	\$228,657
Albert Einstein	264	11.1	67	25.4	31.1	280,900
Crozer-Chester	282	16.4	69	24.5	33.3	671,008
Frankford	273	9.6	36	13.2	26.8	217,343
Hahnemann University	292	17.8	74	25.3	40.0	698,389
Hospital of the Univ. of Pa.	673	20.2	121	18.0	31.2	387,835
Lankenau	120	6.2	31	25.8	28.7	365,108
Pennsylvania	232	10.8	33	14.2	25.6	237,156
St. Mary	327	16.0	48	14.7	22.1	142,444
Temple University	537	20.4	96	17.9	35.9	791,576
Thomas Jefferson University	382	12.3	37	9.7	25.6	283,912
Statewide Peer Group 1	8,894	14.0	1,259	14.2	24.5	273,626

Infection Rates by Region

Region	Urinary tract	Surgical site	Pneumonia	Blood-stream	Multiple	Total per 1,000 patients
Suburban Philadelphia	6.0	2.9	1.1	1.9	1.0	10.5
Philadelphia	6.4	5.8	1.1	3.2	1.4	13.2
Statewide	7.2	5.2	1.2	1.7	1.2	12.2

SOURCE: Pennsylvania Health Care Cost Containment Council

The Philadelphia Inquirer



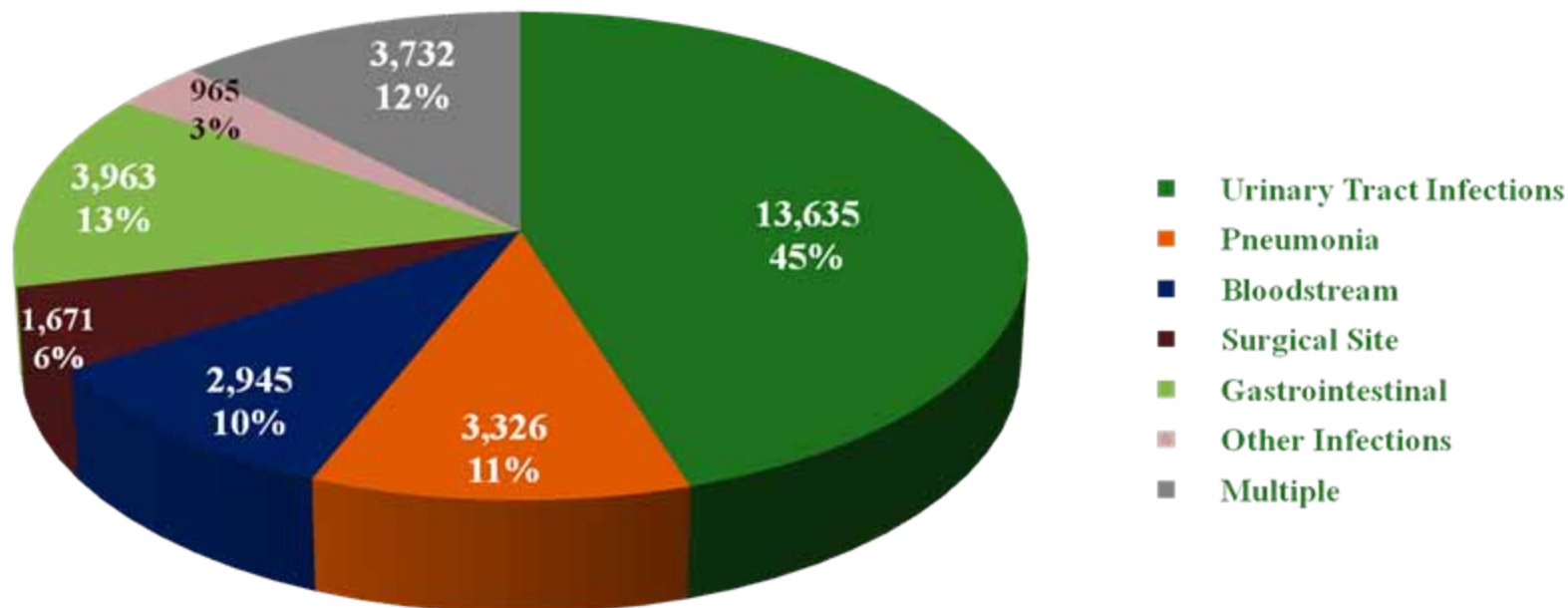
Administrative coding data, compared with CDC/NHSN criteria, are poor indicators of health care–associated infections

Kurt B. Stevenson, MD, MPH,^{a,b} Yosef Khan, MBBS, MPH,^{a,b} Jeanne Dickman, MT, CIC,^a Terri Gillenwater, RN, BSN,^c Pat Kulich, RN, CIC,^a Carol Myers, RN, BSN, CIC,^a David Taylor, PhD,^a Jennifer Santangelo, BA,^d Jennifer Lundy, BS, MHA,^d David Jarjoura, PhD,^e Xiaobai Li, PhD,^e Janice Shook, BS,^b and Julie E. Mangino, MD^{a,b}
Columbus, Ohio

Retrospective review of 3882 surgical procedures, 1599 patients at risk for BSI, and 193 patients at risk for VAP during 2005 for which infection surveillance using CDC NHSN definitions were completed. Using ICD-9-CM procedure codes, a data set of the identical patients at risk were recreated and secondary ICD-9-CM codes were applied for determination of HAIs by coding.

Hospital-Acquired Infections in Pennsylvania

2007 Number of Infections

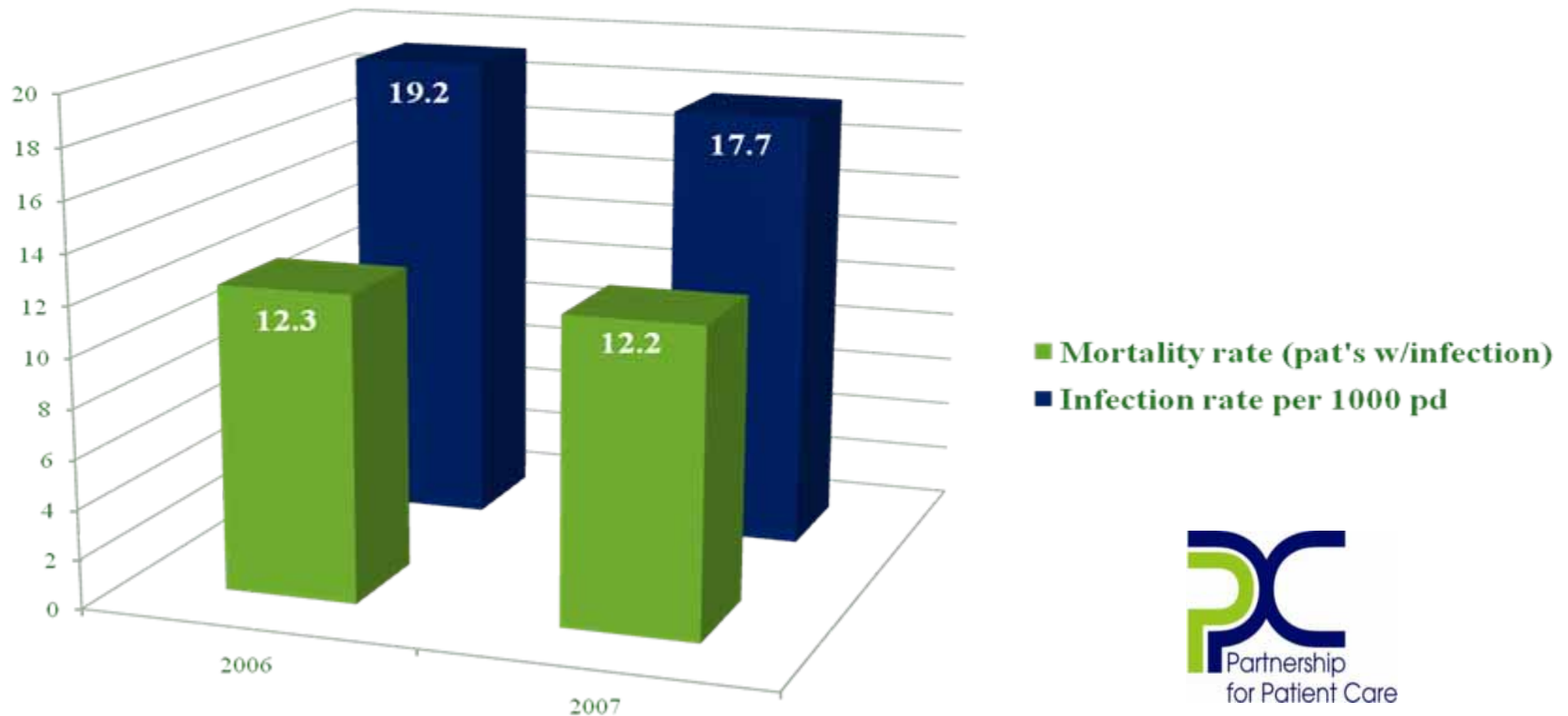


Source: Pennsylvania Health Care Cost Containment Council

Hospital-Acquired Infections in Pennsylvania

Change in Infection Rate and Mortality Rate

2006 - 2007



2007 Healthcare Reform: A Prescription for Pennsylvania

- ❑ **Governor's program to insure all Pennsylvanians**
- ❑ **Cost ~ \$10 billion; Anticipated budget gap - \$3.2 billion**
- ❑ **Plan to fill budget gap by preventing HAIs**
- ❑ **Bills introduced into the State General Assembly**
- ❑ **Act 52 of 2007 signed into law on July 20, 2007**



Rx for PA: Governor's Office of Healthcare Reform



JANUARY 2007

GOHCR | Edward G. Rendell, Governor, Commonwealth of Pennsylvania | www.PaGov.com



Act 52 of 2007 Quality Component

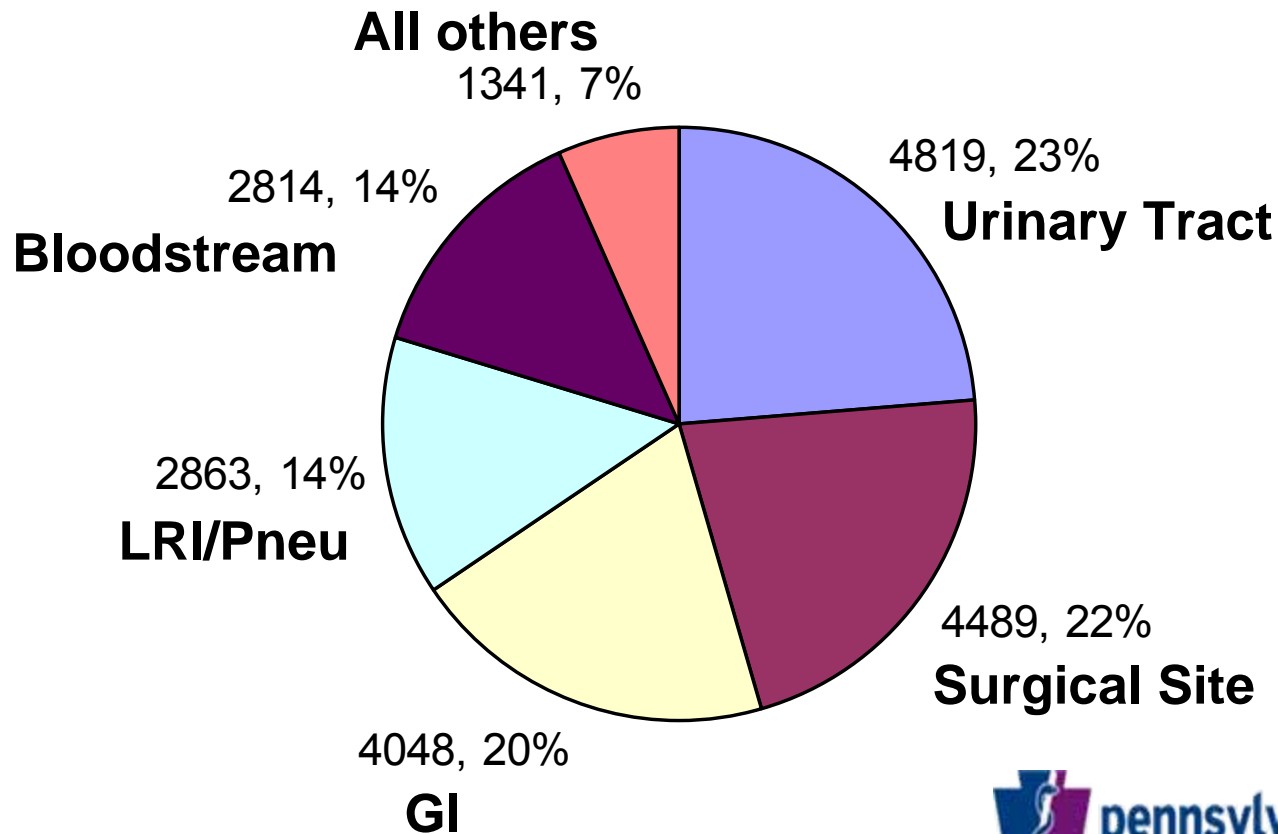
Goal: To eliminate virtually all HAIs

- Initial focus: MRSA, SSI, VAP, CLABSI
- Disclosure rules
- NHSN participation
- Require electronic surveillance system
- Fund regional best practice training
- Eliminate perverse incentives
- Nursing facilities to report HAIs
- Requires screening of MRSA-exposed
- Penalties and rewards



Pennsylvania Infection Distribution by Type

NHSN Reporting Period Q3 08 - Q1 09



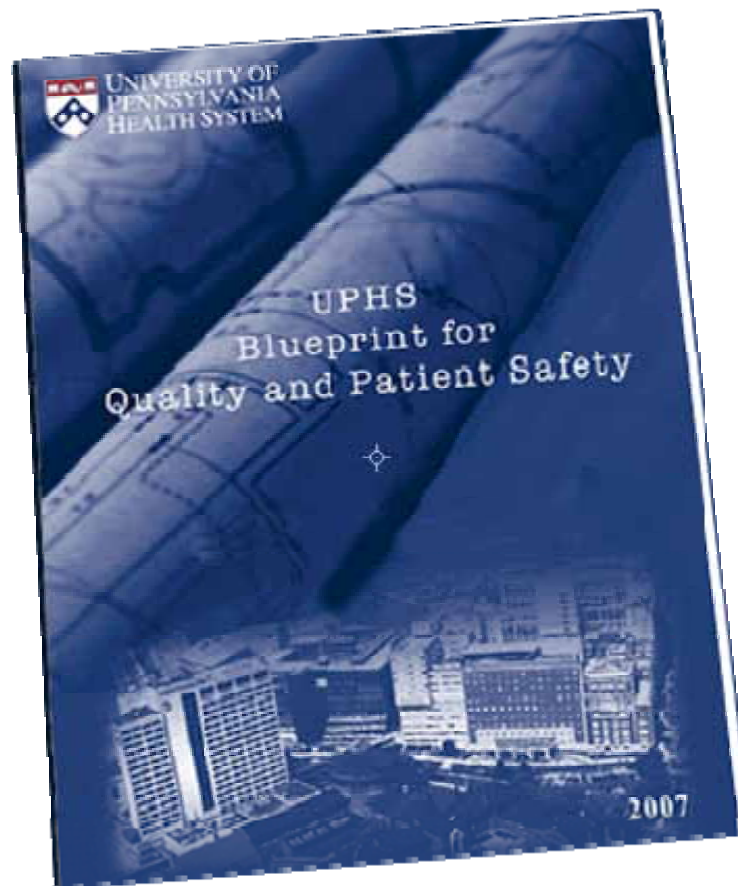
Quality Imperatives Key Driver of Strategy

The Blueprint for Quality is a Critical Component for UPHS Clinical and Financial Strategy

UPHS Blueprint for Quality and Patient Safety

UPHS' **overarching quality goal** is to prevent the preventable — **reduce mortality** and **reduce 30-day re-admissions.**

Four Imperatives	Priority Actions
1. Transitions in care	<ul style="list-style-type: none"> ▪ Transition planning ▪ Medication management
2. Reduce unnecessary variations in practice	<ul style="list-style-type: none"> ▪ Reduce hospital-acquired infections ▪ Reduce medication errors
3. Coordination of care	<ul style="list-style-type: none"> ▪ Interdisciplinary rounding
4. Accountability	<ul style="list-style-type: none"> ▪ Unit clinical leadership



Imperatives Behind UPHS' Quality Goals

Quality Goal #1: Mortality Reduction

External Imperatives

- Public metrics
- P4P
- Patient safety
- Anticoagulation
- Boards on board
- BSIs
- VAP
- SCIP

Organizational Strategies

Quality Goal #2: Better Transitions



FY'09 Quality Strategies for UPHS

The CMOs and CNOs have identified FY'09 quality targets for UPHS.

The targets are directly aligned to the UPHS Blueprint for Quality and Patient Safety, which is UPHS' framework for clinical strategy.

UPHS Blueprint for Quality and Patient Safety	
UPHS' overarching quality goal is to prevent the preventable — reduce QIII/QIV mortality and reduce 30-day re-admissions.	
Four Imperatives	Priority Actions
1. Transitions in care	<input type="checkbox"/> Transition planning <input type="checkbox"/> Medication management
2. Reduce unnecessary variations in practice	<input type="checkbox"/> Reduce hospital-acquired infections <input type="checkbox"/> Reduce medication errors
3. Coordination of care	<input type="checkbox"/> Interdisciplinary rounding
4. Accountability	<input type="checkbox"/> Unit clinical leadership

Accountability — FY'09 Targets
All Units
Selected Units
<input type="checkbox"/> Timely launch of Unit Clinical Leadership team

Transitions in Care — FY'09 Targets
All Units
<ul style="list-style-type: none"> • Increase use of homecare • Med reconciliation on admission
Selected Units
<ul style="list-style-type: none"> • HUP only: 25% reduction in preventable readmits for CHF, Diabetes & Anticoagulation for patients from HCHS • Increase appropriate use of hospice • Core measures — heart failure discharge instructions • Unplanned readmission to ICU

Reduce Variations in Practice — FY'09 Targets
All Units
<input type="checkbox"/> Reduce CR bloodstream infections <input type="checkbox"/> Reduce urinary tract infections <input type="checkbox"/> Time to admin of STAT antibiotics <input type="checkbox"/> Decrease rate of DVTs & PEs <input type="checkbox"/> Decrease falls with injury <input type="checkbox"/> Decrease pressure ulcers <input type="checkbox"/> Adherence to hand hygiene
Selected Units
<ul style="list-style-type: none"> • Ventilator-associated pneumonia • SCIP (Surgical Care Improvement Program) • Process improvements for high risk patient populations • HUP only: Med errors (applies to HUP pharmacy, but goals are unit specific)

Coordination of Care — FY'09 Targets
All Units
<ul style="list-style-type: none"> • “Staff worked together” (Press Ganey) • Likelihood of recommendation (HCAHPS) • Anticipated discharge by patient (Patient Progression)



Blue Cross Pay for Performance FY09

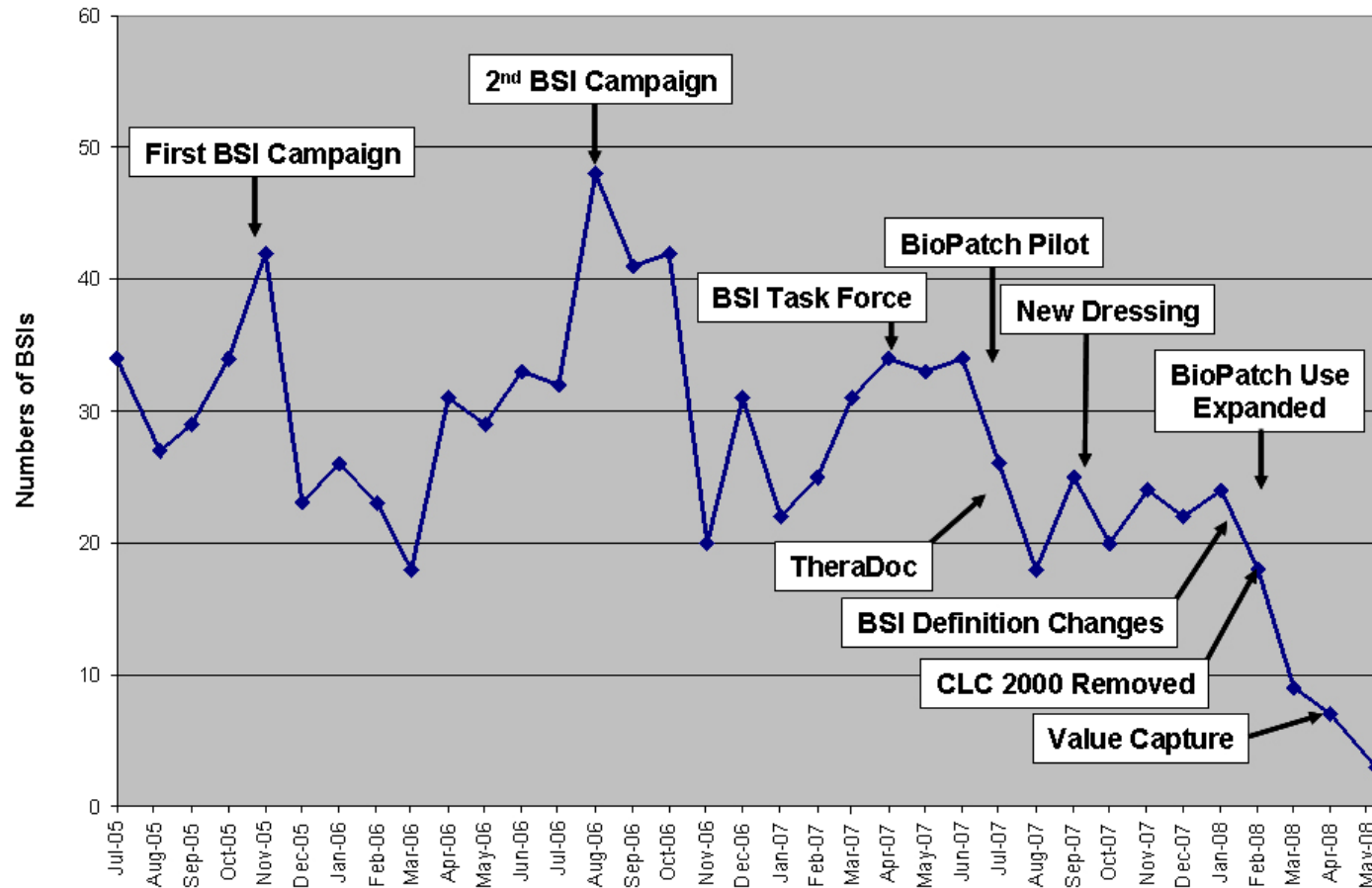
UPHS achieved a final effective score of 94 out of 100 for the FY09 contract year. This equates to \$5.3M in total revenue, an increment of approximately \$1M from FY08.

Patient Safety Program	Full Weight Potential	Final Weighted Score
Anticoagulation	15%	8.5
Boards on Board	15%	15.0
Vent Assoc Pneumonia	25%	24.2
Urinary Tract Infections	0%	0
Central Line Infections	30%	30.0
Surg Care Improvement	15%	13.8



Penn Medicine: Reducing Bloodstream Infections

Numbers of Bloodstream Infections: FY06-Present



Public Reporting Challenges in Pennsylvania

❑ Use of NHSN

- System not designed for this purpose
- Complex/high maintenance
- Learning curve
- System outside our control
- Limited ability to diagnose problems
- System updates

❑ Multiple organizations/conveying of rights



Public Reporting Challenges in Pennsylvania

❑ Substantial time and effort by users

- Costs
- Personnel

❑ Long term care facility capacity

- Separate system
- Infrastructure

❑ Need to demonstrate reductions

- Data quality
- Ability to investigate findings
- MRSA screening



Focused Discussion

Barry M. Straube, MD
Chief Medical Officer, &
Director, Office of Clinical Standards & Quality
Centers for Medicare & Medicaid Services
Healthcare-associated Infections:
Strategies for Elimination

 **Centers for Medicare & Medicaid Services**



2009 Medicare Trust Fund Report

Income to the HI Trust Fund will soon become inadequate to fund the HI portion of Medicare benefits

- ❑ HI Trust Funds to be depleted by 2016**
- ❑ Expenditures currently exceed income/revenue**
- ❑ Recipients of benefits growing, workers to beneficiaries decreasing**
- ❑ Overall economy affects Trust Fund, currently negatively**
- ❑ HI deficit over the next 75 years is \$13.4 trillion. Eliminating the deficit would require:
 - Immediate 134% increase in payroll tax, or**
 - Immediate 53% reduction in benefits, or**
 - Combination of both****
- ❑ This dismal situation is in addition to the increased funding needs of Medicare Parts B & D that are funded out of the general fund and premium payments that are adjusted annually**



CMS as a Public Health Agency

- ❑ **Population health as well as person-centeredness**
- ❑ **Using CMS influence and financial leverage, in partnership with other HHS components, to transform American healthcare system**
- ❑ **Focusing on not just Medicare & Medicaid, but also Commercial, uninsured, etc**
- ❑ **Quality, Value, Efficiency**
- ❑ **Assisting patients and providers in receiving evidence-based, technologically-advanced care while reducing avoidable complications & unnecessary costs**



Ensuring Quality & Value: CMS Strategies

- ❑ **“Traditional Quality Improvement”**
- ❑ **Transparency: Public reporting & data sharing**
- ❑ **Incentives:**
 - **Financial: Value-Based Purchasing**
 - **Non-financial**
- ❑ **Regulatory vehicles**
- ❑ **Demonstrations, pilots, research**
- ❑ **Coverage decision-making and comparative effectiveness**
- ❑ **Leveraging efforts with other HHS components, state/federal agencies & private sector**



Traditional Quality Improvement

❑ Multiple collaboratives

- Regional
- National
- Local

❑ Examples of national collaboratives

- Surgical Care Improvement Program (SCIP)
 - ✓ NSQIP, others
- 100K Lives Campaign
- HRSA Organ Donation Collaborative
- NQF National Priorities Partnership
- Obesity, diabetes, smoking cessation, immunizations



Traditional Quality Improvement

❑ QIO Program 9th SOW

- HAIs under patient safety theme
- Reduction of MRSA infections in 440 hospitals nationwide
 - ✓ CDC National Healthcare Safety Network (NHSN)
 - ✓ AHRQ TeamSTEPPS methodology
- Pilot programs: ? 10th SOW inclusion
 - ✓ *C. difficile* infection reduction
 - ✓ Urinary tract catheter infection reduction



Traditional Quality Improvement

- ❑ **ESRD Network Program QI activities**
 - **Individual ESRD Networks have included activities to address infections in vascular access as well as other infection control issues, including facility-acquired infections (dialysis facilities and some hospitals)**

- ❑ **Collaboration with other HHS agencies, other state/federal agencies, private sector organizations**



Traditional Quality Improvement (& Incentives): CMS Hospital Quality Initiative

- ❑ **National Voluntary Hospital Reporting Initiative (NVHRI) public-private initiative**
 - Federation of American Hospitals
 - AHA
 - AAMC
 - CMS , JCAHO, others

- ❑ **Hospital Quality Alliance**

- ❑ **Medicare Modernization Act of 2003: Section 501b – Financial incentive of 0.4%**



Traditional Quality Improvement (& Incentives): CMS Hospital Quality Initiative

- ❑ **“Voluntary” participation went from 10% of hospitals reporting some of 10 measures to over 95%**
- ❑ **Incentive increased from 0.4% to 2% of APU under DRA**
- ❑ **Current year 96% of hospitals qualified**
 - **44 measures (includes Hospital CAHPS)**
 - **Recent inclusion of mortality and readmission rates for AMI, CHF, Pneumonia**
 - **Plan to test EHR submission soon**
- ❑ **Pay-for-Reporting works, better than voluntarism**
- ❑ **Quality reporting roadmap: Voluntary to P4R to P4P**



Transparency: CMS Compare Websites

- ❑ **Hospital Compare**
- ❑ **Nursing Home Compare**
- ❑ **Home Health Compare**
- ❑ **Dialysis Facility Compare**
- ❑ **Health Plan and Medi-Gap Compare**
- ❑ **Prescription Drug Plan Compare**
- ❑ **Physician Compare in future**
- ❑ **Continuum of Care in future**
 - **Overall efficiency across settings**
 - **Care transitions and coordination**
- ❑ **MyMedicare.gov**



Transparency

- ❑ **Additional reporting of HAI measures**
 - **Considering for future Hospital Compare updates**
 - **Discussing inclusion of CDC NHSN measures**
 - **Requires NQF endorsement and Hospital Quality Alliance and other stakeholder input**
 - **Expand to other provider sites, starting with:**
 - ✓ **Ambulatory surgery centers**
 - ✓ **Dialysis facilities**
 - **Link to transitions of care and episodes of care**



Transparency

- ❑ **The White House, the Secretary and HHS have prioritized the concept of HHS making its data available to all healthcare stakeholders**
- ❑ **www.data.gov development and expansion**
- ❑ **CMS has now added the concept that as part of its public health agency role, collecting, reporting and making healthcare data available is a core competency/mission**



Incentives

❑ Current

- P4R: RHQDAPU, HOPQDRP, PQRI
- ARRA /HITECH: EHRs in hospitals, MD offices

❑ Value-based Purchasing (VBP)

- Hospital VBP Report to Congress (Nov 2007)
- Physician VBP RTC due May 2010
- ESRD Quality Incentive Program to be implemented by January 1, 2012
- All other settings with plans

❑ Healthcare Reform debate may define better



Support for Incentives via VBP

- ❑ **President's Budget**
 - Includes line items for HAls and HACs
- ❑ **Congressional Interest in P4P and Other Value-Based Purchasing Tools**
 - BIPA, MMA, DRA, TRCHA, MMSEA, MIPPA, ARRA
- ❑ **MedPAC Reports to Congress**
 - P4P recommendations related to quality, efficiency, health information technology, and payment reform
- ❑ **IOM Reports**
 - P4P recommendations in *To Err Is Human* and *Crossing the Quality Chasm*
 - Report, *Rewarding Provider Performance: Aligning Incentives in Medicare*
- ❑ **States & Private Sector**
 - Private health plans: Commercial, Medicare, Medicaid, SNPs
 - Employer coalitions



Premier Hospital Quality Demonstration

- ❑ **260 participating hospitals**
 - **Wide variation in demographics, funding**

- ❑ **34 Quality Metrics**
 - **Acute myocardial infarction (9)**
 - **Coronary artery bypass graft (8)**
 - **Heart failure (4)**
 - **Community acquired pneumonia (7)**
 - **Hip and knee replacement (6)**

Premier Demonstration

❑ Hospital scores

- “Rolling up” individual measures into one score for each disease category
- Each disease category will be categorized by hospital scores by decimal

❑ Public reporting of all data will be available

❑ Financial awards

- Hospitals in top 20% will be given bonuses: 2% for top decimal, 1% for second decimal
- Top 50% recognized on CMS website



The NEW ENGLAND JOURNAL of MEDICINE

SPECIAL ARTICLE

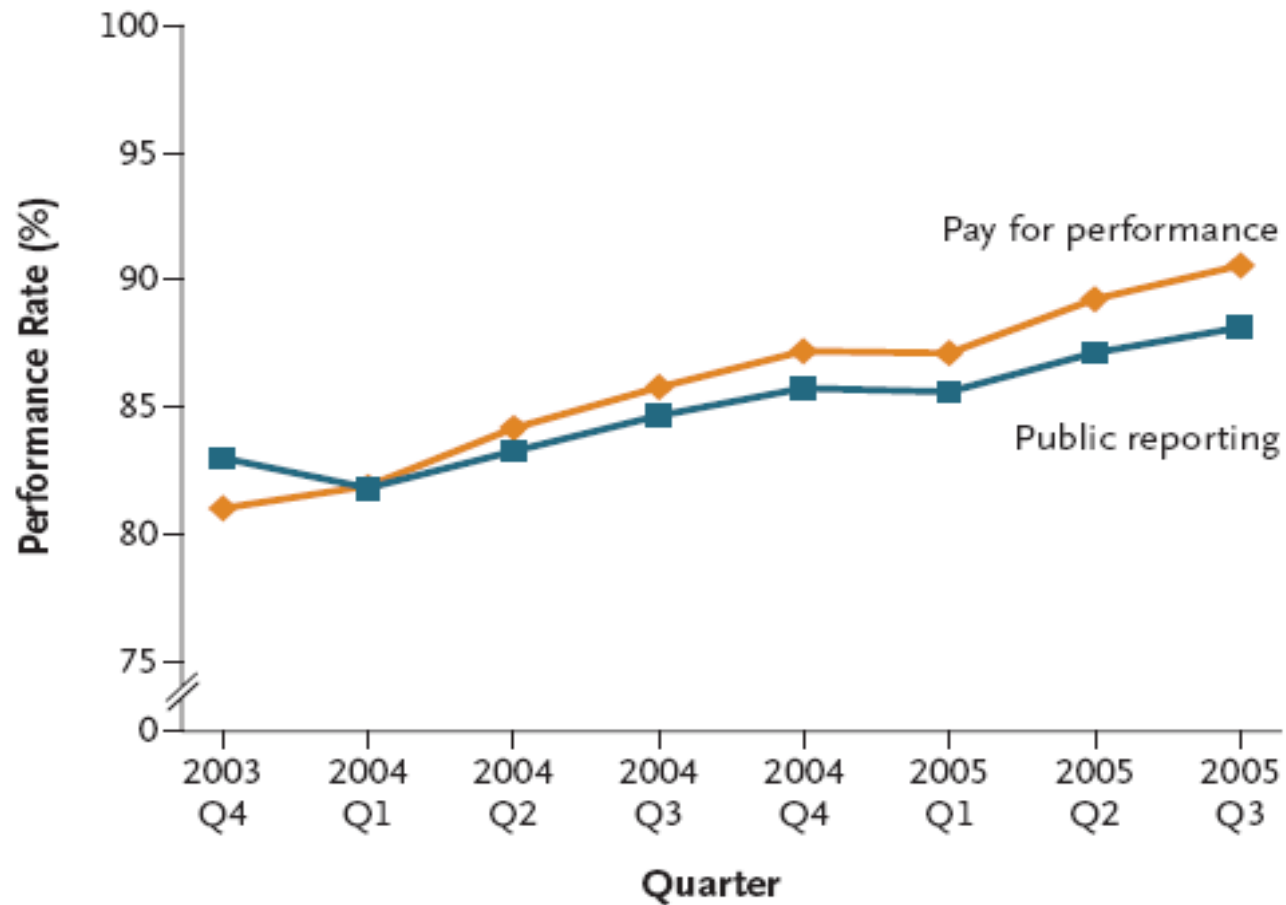
Public Reporting and Pay for Performance in Hospital Quality Improvement

Peter K. Lindenauer, M.D., M.Sc., Denise Remus, Ph.D., R.N.,
Sheila Roman, M.D., M.P.H., Michael B. Rothberg, M.D., M.P.H.,
Evan M. Benjamin, M.D., Allen Ma, Ph.D., and Dale W. Bratzler, D.O., M.P.H.



Composite of 10 Measures

D Composite of 10 Measures



Incentives: Hospital Acquired Conditions

- ❑ **DRA Section 5001(c) authorized this approach**
- ❑ **Beginning October 1, 2007, IPPS hospitals were required to submit data on their claims for payment indicating whether diagnoses were present on admission (POA)**
- ❑ **Beginning October 1, 2008, CMS stopped assigning a case to a higher DRG based on the occurrence of one of the selected conditions, if that condition was acquired during the hospitalization**



Incentives: HACs

- ❑ Almost all HACs might have indirect relationship to potential HAIs
- ❑ HACs clearly linked to HAIs
 - Catheter-associated UTI
 - Vascular catheter associated infection
 - Surgical site infections
 - ✓ Mediastinitis after CABG
 - ✓ Certain orthopedic surgeries
 - ✓ Bariatric surgery for obesity
- ❑ Inclusion of HAIs and HACs in VBP programs



Conditions of Participation

- ❑ **COPs are minimum health and safety standards set by CMS for facilities that may receive Medicare payments**
 - **17 separate provider settings plus supplier settings**

- ❑ **Current Infection Control COPs generally address reduction of HAIs**

- ❑ **Expansion possibilities for COPs**
 - **Require facilities to incorporate specific standards of practice or guidelines set by the Secretary**
 - **Require that infection control be part of the QAPI program**



Conditions of Participation

- ❑ **Infection control regulations already strengthened**
 - **Conditions for Coverage for ESRD facilities (April 15, 2008)**
 - **CfC for Ambulatory Surgery Centers (ASCs) (November 18, 2008)**

- ❑ **Other current considerations**
 - **Omnibus COP/CfC Rule for HAIs**
 - **Individual setting strengthening of current regulations**



Survey & Certification

- ❑ **All U.S. healthcare facilities certified by Medicare are expected to be in compliance with all current regulations, as well as applicable state laws**

- ❑ **S&C process uses interpretive guidelines to assess compliance with regulations**
 - **Focus on HAIs can be prioritized**
 - **Surveyor training has included HAI emphasis**
 - **Web-based training & surveyor tools being developed**
 - **Interpretive guidelines for 2010 to include QAPI opportunities for hospitals**
 - **Focused facility approach feasible merging QI & S&C**



Other

- ❑ **Demonstrations, pilots, research**
 - **ARRA funding and other funding sources should also focus on HAIs as they fall under:**
 - ✓ **Comparative Effectiveness Research**
 - ✓ **Prevention, Wellness, Patient Safety**
 - **CMS will incorporate HAI topics into its demos, when appropriate**

- ❑ **Cross Agency HHS collaboration (a priority for all issues from the Secretary), as well as with other federal/state agencies, private sector**



Future: CMS-CDC HAI Collaboration

❑ Traditional QI

- Measures identification, prioritization, development, testing & implementation
- Data collection facilitation: Claims, administrative sources, registries, EHRs, etc.
- QI collaboratives, leveraging existing efforts

❑ Transparency

- Compare Websites collaboration: NHSN to start?
- www.data.gov data submission

❑ Incentives

- Prioritization and alignment of VBP topics/foci



Future: CMS-CDC HAI Collaboration

❑ Conditions of Participation

- Increased joint review of infection control sections of COPs
- Joint regular maintenance of COPs
- Emergency & urgent focus on infectious topics
 - ✓ HAVBED monitoring system of ASPR as example
 - ✓ NHSN as monitoring system

❑ Survey & Certification

- Surveyor guideline development
- Focused facility strategy



Future: CMS-CDC HAI Collaboration

❑ Demonstrations & Research

- Evidence-based guidelines development
- Evidence-based interventions development and piloting

❑ Coverage Decision-Making

❑ Cross-Agency collaboration within HHS and federal government

- A priority for the Secretary and HHS
- Diabetes self-management as example



PUBLIC HEALTH GRAND ROUNDS

Office of the Director

October 15, 2009

