

# DHQP Updates

- Recovery Act
- H1N1

## Recent meetings

- CDC Public Health Grand Rounds
- ARRA Grantee meeting
- Epicenter meeting
- HHS Steering Committee on HAI prevention

# Injection Safety

- Safe Injection Practices Coalition
- State funds to pilot campaign
- Collaborations with CMS
  - Recovery act
  - Training
- CDC-CMS Interagency agreement
- Patient Notifications Best Practices Meeting, December 3, 2009
- Industry Partners Meeting, Early 2010



# Improve Antimicrobial Use

- To optimize the use of antimicrobial agents in in-patient healthcare settings
- Institute for Healthcare Improvement
  - Plans to add improving antimicrobial use to improvement map
  - Collaborating with CDC on change package ideas
- Recent projects funded through CDC Foundation
  - Michigan: Improving use related to CAUTI
  - Chicago: Using local data to improve empiric use

# Surveillance

- Collaboration with CMS (Hospital Compare)
- Work with AHRQ/HRET for CUSP
- Initial work with HRSA
- Follow-up from HHS stakeholders meetings
- NHSN Steering Committee
- NHSN annual report

# Laboratory

- Follow up to Peer Review
- Reorganization
- Refinement of research agenda
- Environmental microbiology capacity

# Other DHQP Activities

- Vaccine safety
- Adverse drug events
- Blood, tissue and organ safety
- Healthcare preparedness



## 2009 American Recovery and Reinvestment Act

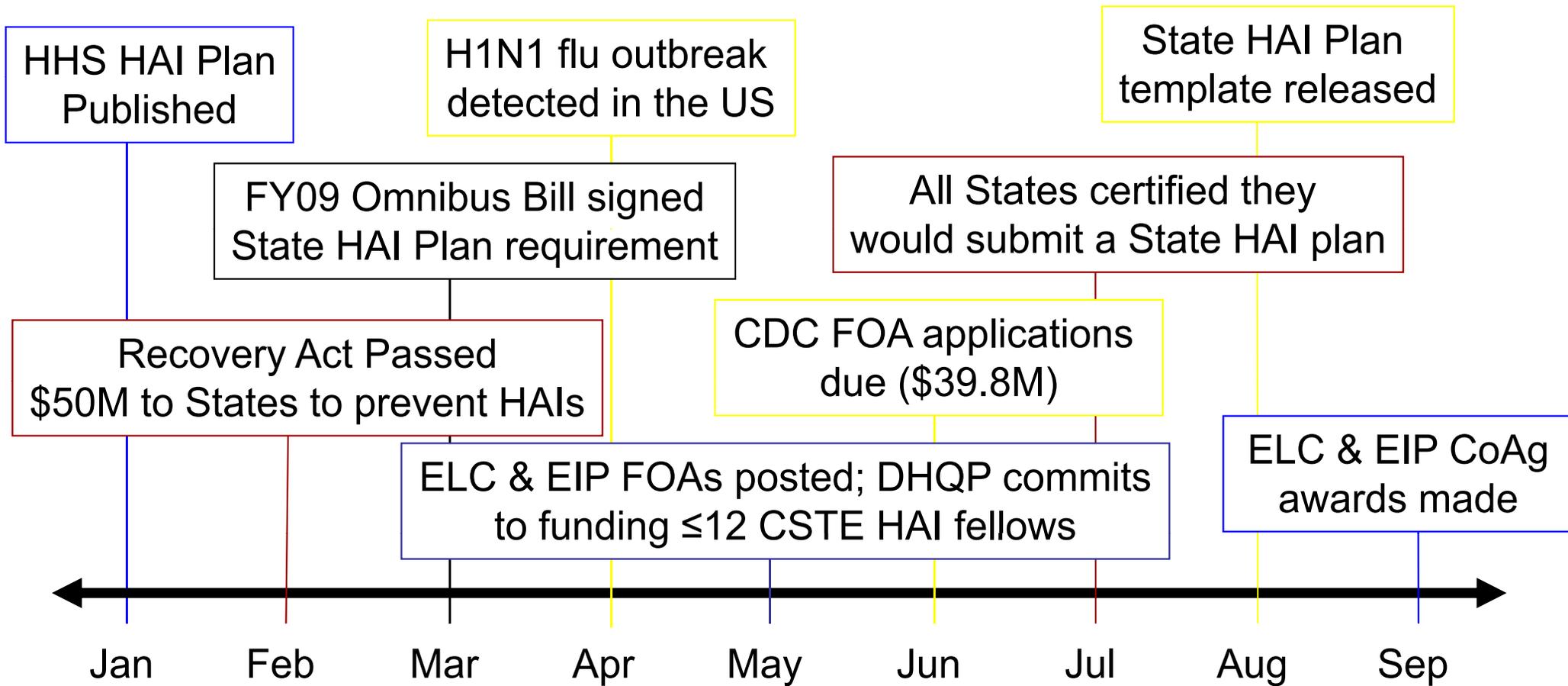
# Healthcare-associated Infections

*Chesley Richards, MD, MPH*

*Deputy Director*

*Division of Healthcare Quality Promotion*

# What a year this has been...



2009

# HHS Action Plan

In January 2009, the Department of Health and Human Services released the HHS Action Plan to Prevent Healthcare-Associated Infections (<http://www.hhs.gov/ophs/initiatives/hai>).

## 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>.

# State HAI Plan Legislation

On March 11, 2009, the President signed the 2009 Omnibus bill, thereby enacting funding for most of the Federal Government.

Fiscal Year 2009 Omnibus Bill:

- Requires states receiving Preventive Health and Health Services (PHHS) Block Grant funds to certify that they will submit an HAI plan to the Secretary of HHS not later than January 1, 2010
- State plans will:
  - Be consistent with the HHS Action Plan
  - Contain measurable 5-year goals and interim milestones for preventing HAIs
  - Be reviewed by the Secretary of HHS with a summary report submitted to Congress by June 1, 2010

# State HAI Plan Template

- Provides framework to ensure progress towards five-year national prevention targets as described in the HHS Action Plan
- Assist state planning efforts in the following areas:
  1. Develop or Enhance HAI Program Infrastructure
  2. Surveillance, Detection, Reporting, and Response
  3. Prevention
  4. Evaluation, Oversight, and Communication

# State HAI Plan Template

Table 1: State infrastructure planning for HAI surveillance, prevention and control.

Planning Level	Check Items Underway	Check Items Planned	Items Planned for Implementation (or currently underway)	Target Dates for Implementation
Level I	<input type="checkbox"/>	<input type="checkbox"/>	<ol style="list-style-type: none"> <li>1. Establish statewide HAI prevention leadership through the formation of multidisciplinary group or state HAI advisory council               <ol style="list-style-type: none"> <li>i. Collaborate with local and regional partners (e.g., state hospital associations, professional societies for infection control and healthcare epidemiology,</li> </ol> </li> </ol>	

## Featured Items:



### State HAI Plan Template

In response to the increasing concerns about the public health impact of healthcare-associated infections (HAIs), the US Department of Health and Human Services (HHS) has developed an Action Plan to Prevent Healthcare-Associated Infections (HHS Action Plan).

# Recovery Act

On February 13, 2009, Congress passed the American Recovery and Reinvestment Act of 2009. Four days later, the President signed the legislation into law. The Recovery Act's three main goals are to:

- Create and save jobs
- Spur economic activity and invest in long-term economic growth
- Foster unprecedented levels of accountability and transparency in government spending

The Prevention and Wellness Fund section of the Recovery Act provides funding to the Office of the Secretary (OS) of the Department of Health and Human Services (HHS) **to be provided to States as an additional amount to carry out activities to reduce healthcare-associated infections.**

# Recovery Act for HAIs: Intent and Background

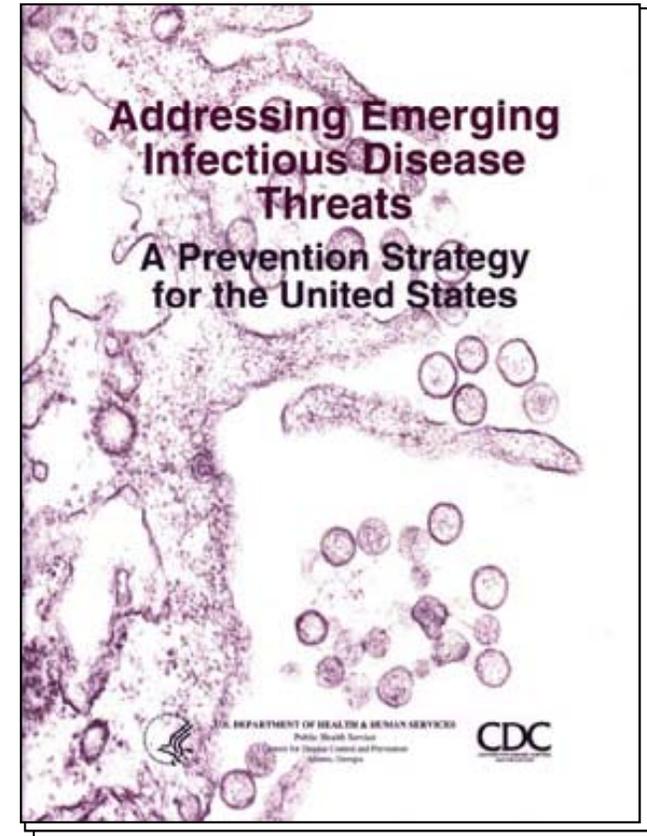
- Requires merit-based selection of recipients
  - Deliver programmatic results
  - Achieve economic stimulus
- Prevention and Wellness Fund
  - U.S. healthcare infrastructure, healthcare costs
  - \$40 million to CDC for HAI
    - Eligibility limited to “States”
    - \$35.8M through ELC/ \$4M through EIP
- The purpose of the Recovery Act HAI supplement is to address the HHS Action Plan by using the existing ELC cooperative agreement to build and sustain state programs to prevent healthcare-associated infections.

# Recovery Act for HAIs: Mechanism

- Epidemiology and Laboratory Capacity (ELC) Program
  - The purpose of the program is to assist eligible public health agencies improve surveillance for, and response to, infectious diseases by
    - (1) strengthening epidemiologic capacity;
    - (2) enhancing laboratory practice;
    - (3) improving information systems; and
    - (4) developing and implementing prevention and control strategies.

# ELC Foundation

- 1995: ELC was initiated in as part of CDC's National strategy, "*Addressing Emerging Infectious Disease Threats*" to improve surveillance for reportable infectious diseases by providing technical and financial assistance to state health departments.
- 1998: Extended the ELC to all states and large local health departments.
- ELC Focus: Naturally occurring infectious diseases, drug-resistant infections, and electronic reporting of surveillance data.



Key Goal: Strengthening collaboration between lab, epi & information systems within grantee jurisdictions.

# ELC Program Components

- General Epi, Laboratory and Health IT
- Foodborne Diseases
- West Nile Virus
- Influenza
- Lyme Disease
- Antimicrobial Resistance
- Prion Disease
- Border Infectious Disease Surveillance (BIDS)
- Recovery Act
  - Healthcare Associated Infections
  - Vaccine Effectiveness



# Recovery Act Funding: ELC Activities (\$35.8M)

## A: State HAI program

- State HAI plan and State HAI coordinator
- Multidisciplinary committee for State HAI program
- Report to CDC on progress in HAI prevention

## B: Expand NHSN

- NHSN state coordinator
- Training for hospitals in state and NHSN expansion
- NHSN reporting on HHS targets
- Validation studies in hospitals in state

## C: State Prevention Collaboratives

- Training for hospitals in state
- Linkage to other HHS and private sector initiatives
  - AHRQ, CMS
- Reductions in HHS Prevention targets

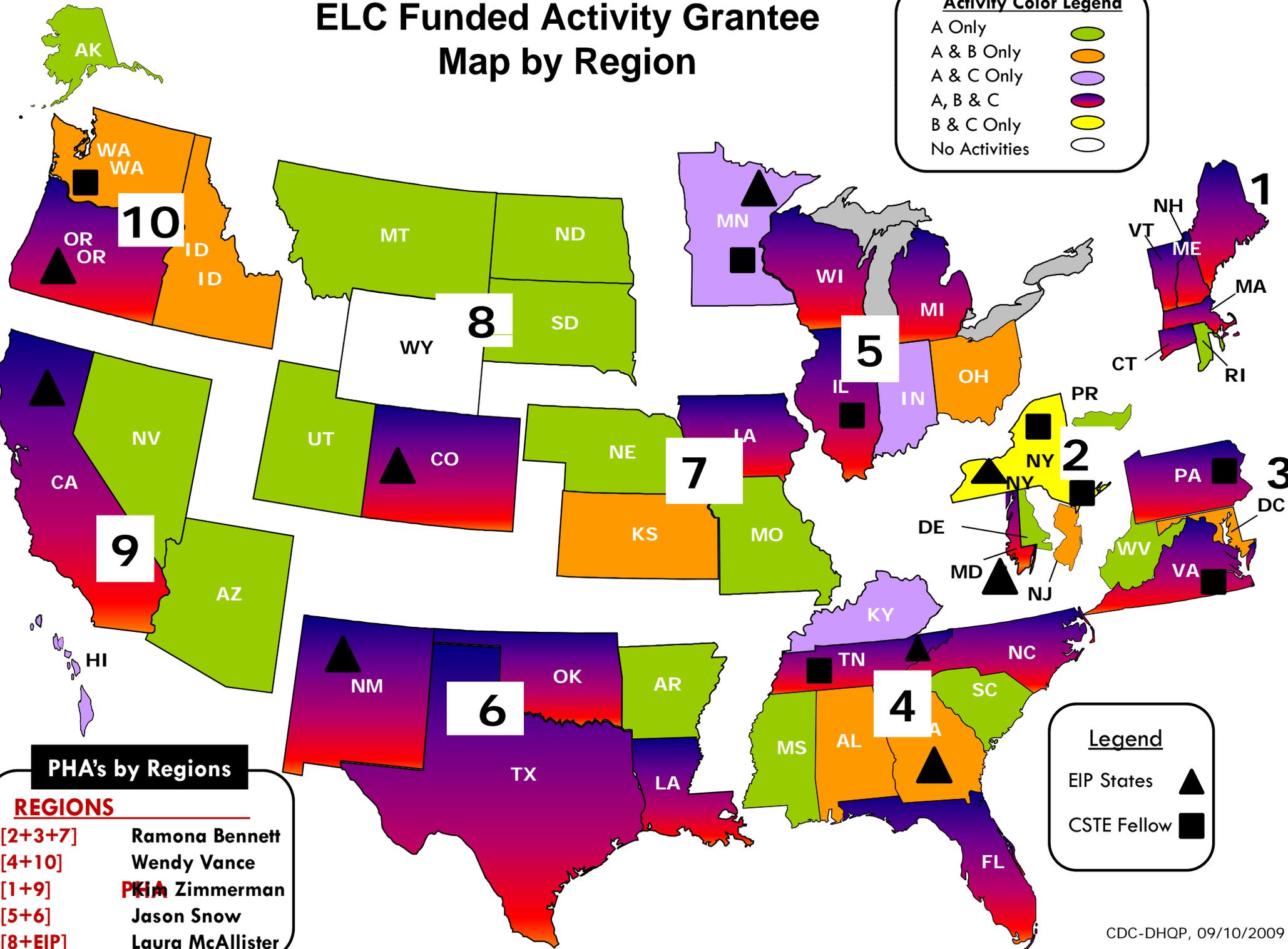
# Opportunity & Impact

- Rapid development and expansion of state-based efforts on HAI prevention
- Develop and expand HAI prevention expertise in State Health Departments
  - where currently there are no mandates
- Strengthen collaboration with HHS and HHS agencies—AHRQ, CMS
- A model for population-based prevention of healthcare safety challenges
- Prevent infections, reduce deaths

# ELC Funded Activity Grantee Map by Region

**Activity Color Legend**

- A Only
- A & B Only
- A & C Only
- A, B & C
- B & C Only
- No Activities



## PHA's by Regions

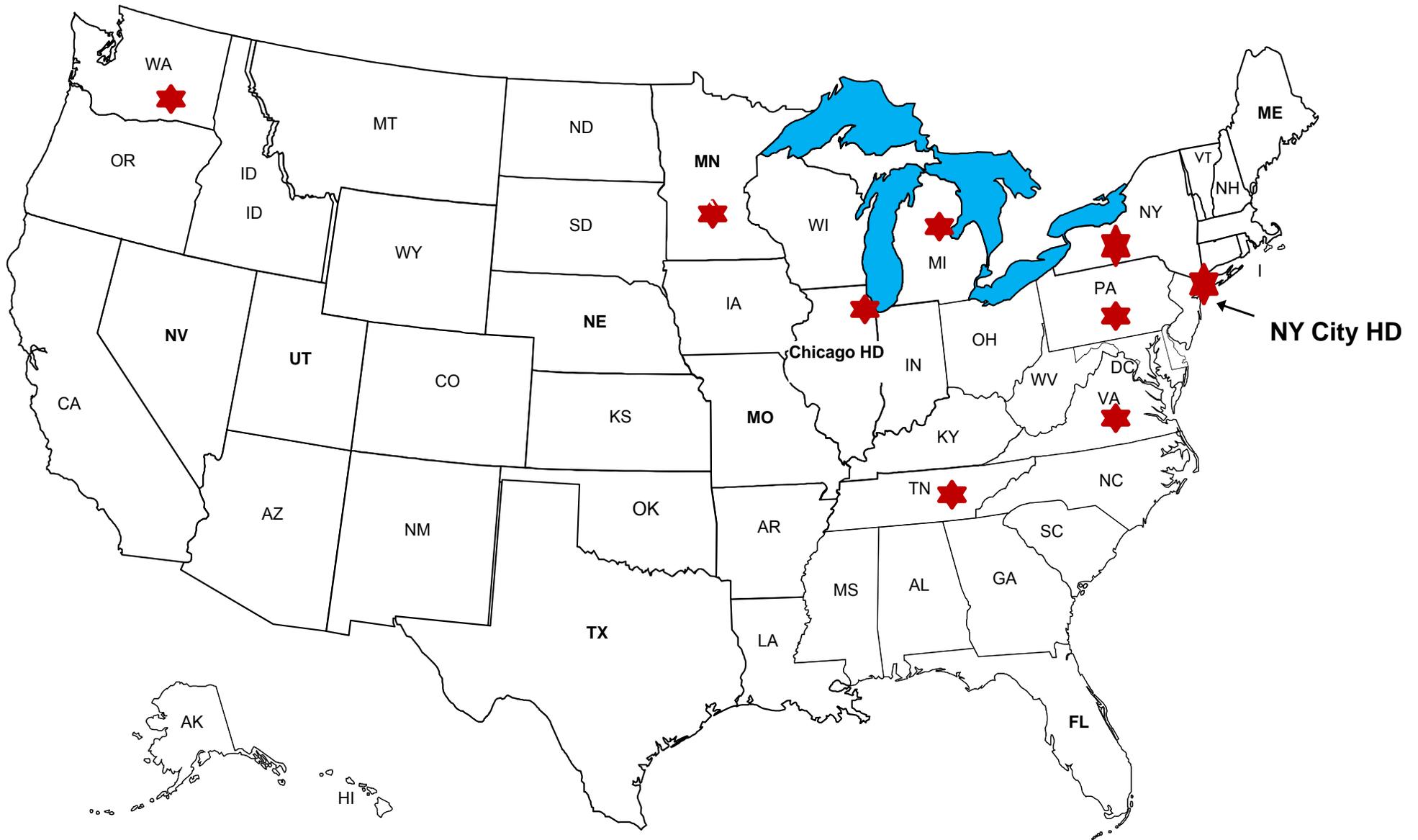
### REGIONS

- [2+3+7] Ramona Bennett
- [4+10] Wendy Vance
- [1+9] ~~PKA~~ Zimmerman
- [5+6] Jason Snow
- [8+EIP] Laura McAllister

**Legend**

- EIP States
- CSTE Fellow

# CSTE HAI Fellows



# Keys for the Elimination of Healthcare-associated Infections

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

# HHS Action Plan for HAI Prevention

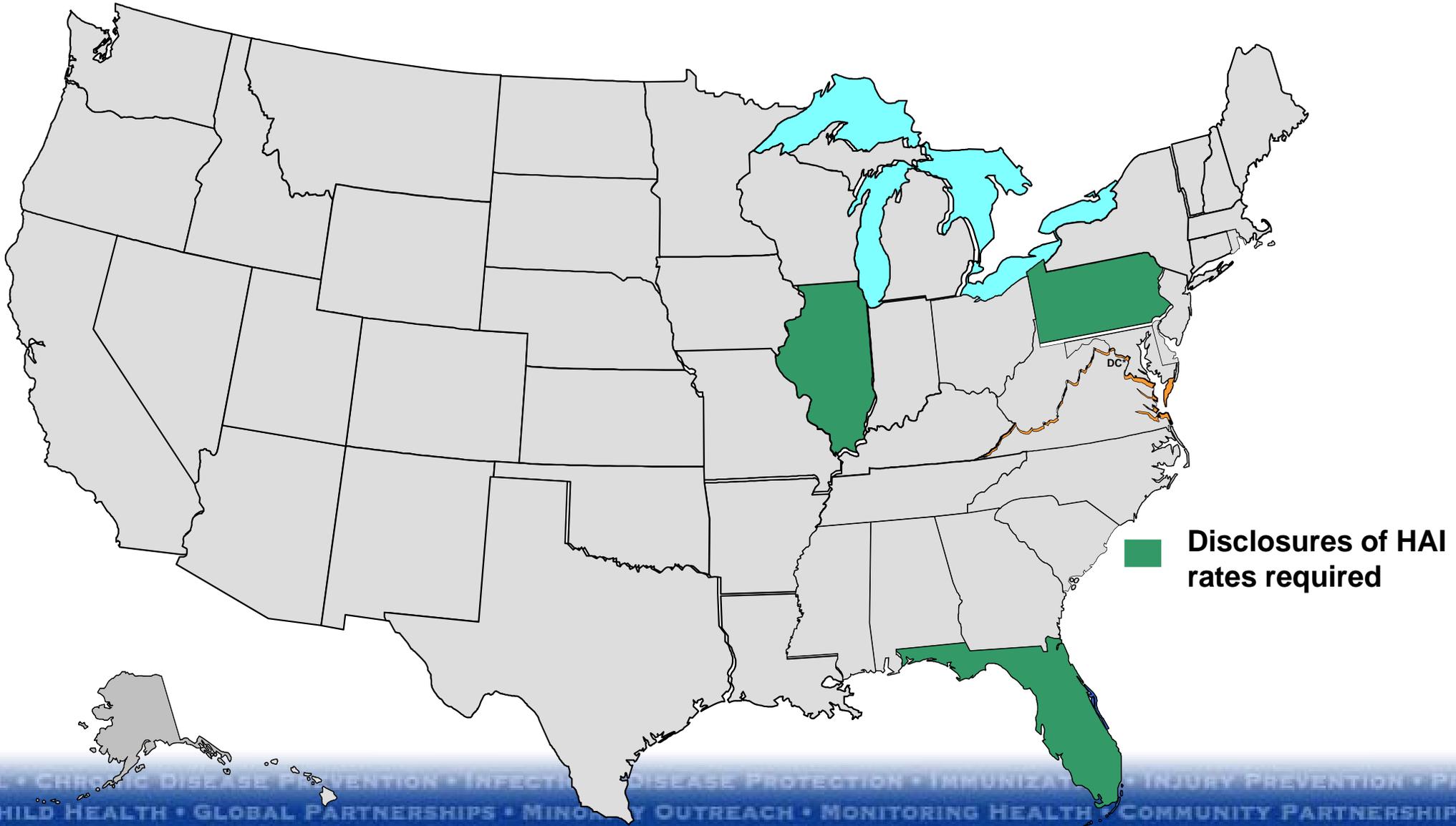
## National 5 Year Goals

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

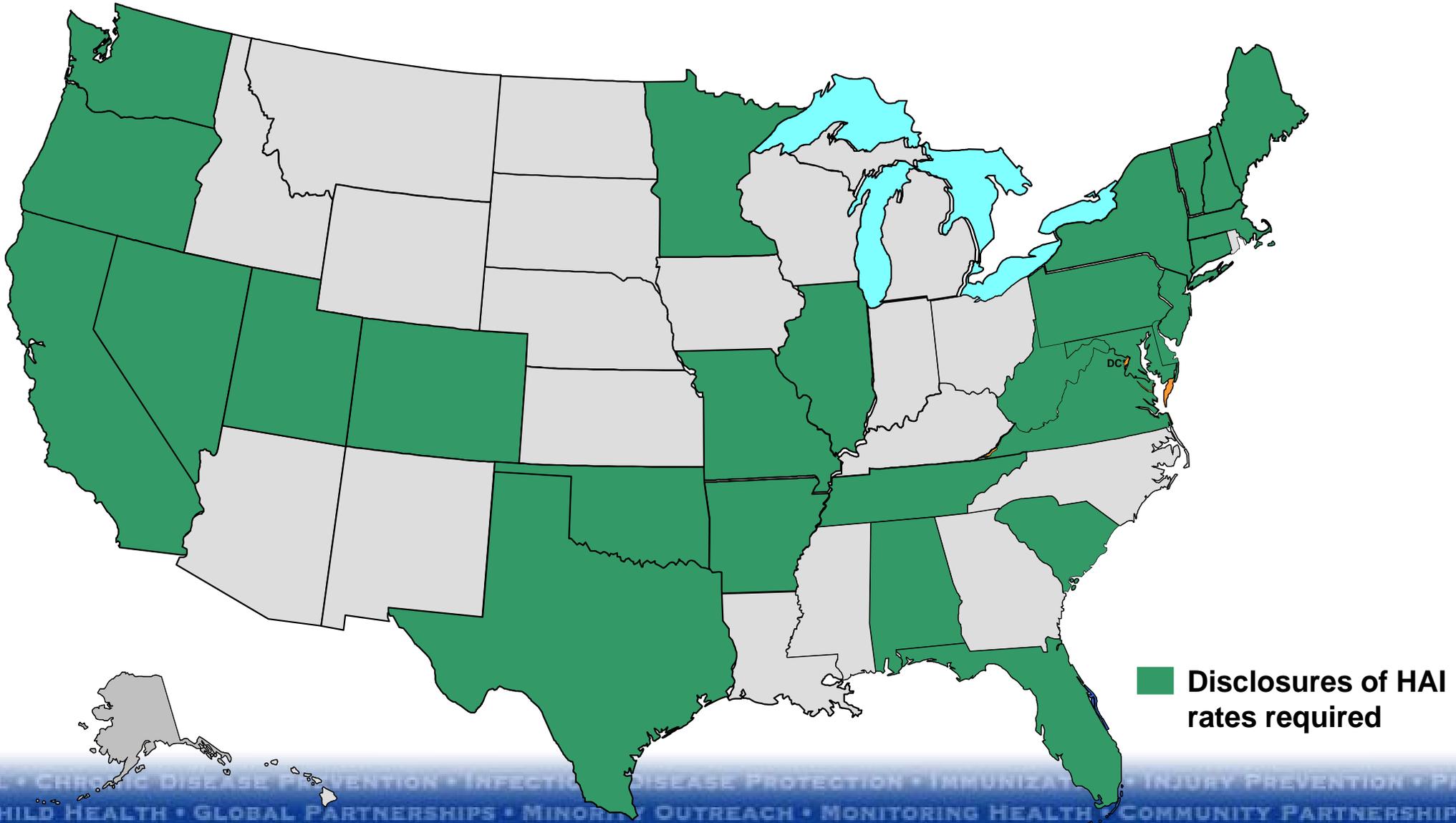
# Health Reform

- **Congress: Health Reform**
  - Health reform bills propose mandatory national public reporting
  - HAI prevention may 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

# Mandatory Public Reporting, 2004



# Mandatory Public Reporting, 2009



# Measurement and Reporting

- **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**
  
- **Publicly reported progress on HHS metrics, by State, January 2010**

# Standardized Infection Ratio?

- Standardized Infection Ratio, SIR, is a summary measure used to compare the HAI experience among one or more groups of patients to that of a standard population's
- Indirect standardization method
- Accounts for differences in risk of HAI among the groups

# Calculating an SIR

$$\text{SIR} = \frac{\text{Observed (O) HAIs}}{\text{Expected (E) HAIs}}$$

- To calculate O, sum the number of HAIs among a group
- To calculate E, requires the use of the appropriate aggregate data (risk-adjusted rates)

# Standardized Infection Ratios (SIR)

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

# Recent Activities

- State Grantees Meeting
  - Oct 19,20 in Atlanta
  - 2 days
  - 28 states represented
  - Topics covered: State HAI plans, NHSN, Prevention Collaboratives, reporting/ARRA funding requirements
  - HHS/OS, IHI, AHRQ/CUSP, AHA
- Webinars
- Web site



## Healthcare-Associated Infections: Recovery Act

### Healthcare-Associated Infections: Recovery Act

[About ELC Funding](#)[About EIP Funding](#)[Supplemental Material](#)[Performance Measures](#)[Eligibility](#)[Application & Submission Information](#)[Agency Contacts](#)

The American Recovery and Reinvestment Act of 2009, Public Law 111-5 (ARRA) was signed into law on February 17, 2009.

The Recovery Act is designed to stimulate economic recovery in various ways including strengthening the Nation's healthcare infrastructure and reducing healthcare costs. Within the Recovery Act, \$50 million was authorized to support states in the prevention and reduction of healthcare associated infections (HAI). The HAI Recovery Act funds will be invested in efforts that support surveillance and prevention of HAIs, encourage collaboration, train the workforce in HAI prevention, and measure outcomes. Many of these funds will be used to support activities outlined in the HHS Action Plan to Prevent Health Care Associated-Infections. This webpage provides information on obtaining funding through the [Epidemiology and Laboratory Capacity \(ELC\)](#) and [Emerging Infections Program \(EIP\)](#).



### Key Dates

- Letter of Intent Deadline (ELC Only): May 22, 2009
- Application Deadline: June 26, 2009
- Anticipated Award Date: August 30, 2009
- State HAI Plans due to HHS: January 1, 2010

### Instructions and Application

Go to [Grant.gov Download Application Package web site](#) and enter the appropriate Funding Opportunity Number listed below to download the application instructions and/or the application package.

### Events

**Grantee Meeting:** Epidemiology and Laboratory Capacity for Infectious Diseases (ELC) Healthcare-Associated Infections (HAI) **October 19<sup>th</sup>-20<sup>th</sup>, 2009**  
**Atlanta Georgia**

For more information, please contact [DHQPHAIARRA@cdc.gov](mailto:DHQPHAIARRA@cdc.gov).

Text size: [S](#) [M](#) [L](#) [XL](#)[Email page](#)[Print page](#)[Bookmark and share](#)[HHS.gov/Recovery](#)[Overview](#)[Plans & Reports](#)[Grants & Contracts](#)[Announcements](#)

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### Related Links

[Grants.Gov](#)[HHS Action Plan to Prevent Healthcare-Associated Infections](#)[Implementing the Recovery Act](#)[Recovery.Gov](#)[The Epidemiology and Laboratory Capacity for Infectious Diseases Program](#)[The Emerging Infections Program](#)

# Information

- Website:  
<http://www.cdc.gov/hai/recoveryact/>
- Mailbox: [DHQPHAIARRA@cdc.gov](mailto:DHQPHAIARRA@cdc.gov)

# Challenges

- Coordination of 51 different projects
  - State HAI plans
  - State HAI programs
  - NHSN utilization by state, expansion
  - Prevention collaborations
- Must show impact
- Metrics and Reporting

# Advice and Feedback

- HAI plans
  - CSTE, ASTHO
- NHSN
  - CSTE, NHSN Steering Work Group
- Prevention
  - Multiple partners
- What role(s) should HICPAC play?

# HICPAC Roles

- Surveillance/Reporting/NHSN
  - Feedback through NHSN Steering Work Group (through rep)
- Prevention Priorities
- State HAI plans

# AHRQ Update

**William B Munier, MD, MBA**

**Director, Center for Quality Improvement and Patient Safety**

**Healthcare Infection Control Practices  
Advisory Committee**

Centers for Disease Control and Prevention

12 November 2009

Washington Marriott at Metro Center

# Presentation Overview

- AHRQ's initial HAI investments
- Current initiatives
- Future directions

# AHRQ Works as a Team

## Interagency HAI Work Group Members

### **AHRQ:**

Bill Baine  
Jim Battles  
Rob Borotkanics  
Jeff Brady  
Kathy Crosson  
Farah Englert  
David Lanier  
Bill Munier  
Salina Prasad  
Cynthia Palmer  
Deborah Queenan  
Loleta Robinson  
Claudia Steiner

### **CDC:**

Kristin Brinsley-Rainisch  
Kate Ellingson  
Rachel Gorwitz  
Carolyn Gould  
Mike Hageman  
Michael Jhung  
John Jernigan  
Cliff McDonald  
Arjun Srinivasan  
Nimalie Stone

### **CMS:**

Marge Cannon  
Lisa Grabert  
Jade Perdue  
Linda Radey

### **OS:**

Agnes Balla  
Rani Jeeva  
Don Wright

# Background

- General AHRQ approach
- Keystone ICU Project – 2003
  - First major AHRQ HAI project: \$454,000
  - Enormously successful in reducing central line infections in ICUs in Michigan
- Barriers & Challenges for Preventing HAIs in 34 Hospitals Initiative – 2007
  - 5 ACTION networks: \$2 million

# MRSA – 2008

- \$5 million in appropriated funds
- Coordinated with CDC & CMS
- Funded 6 projects, e.g.,
  - Implementation of MRSA-reducing practices
  - Contribution of community & LTC to rising occurrence of MRSA in hospital patients
  - Rapid-cycle state & national estimates
  - Understanding MRSA reservoirs

# DHHS HAI Initiatives

- GAO Reports focused on HAIs & DHHS role in prevention & reduction
  - Directive: *interagency collaboration*
- DHHS HAI National Action Plan
  - Prevention & Implementation (CDC)
  - Research (AHRQ)
  - Information Systems & Technology (CDC/ONC)
  - Incentives & Oversight (CMS)
  - Outreach & Messaging (OS)
- ARRA

# MRSA & CUSP\* – 2009

\* Comprehensive Unit-base Safety Program

- \$17 million in appropriated funds
  - \$9 million for MRSA => 8 MRSA projects
  - \$8 million for CUSP => 5 CUSP projects
- Includes projects directed at:
  - *C. difficile*
  - KPC-producing organisms
  - Urinary tract infections
  - Surgical site infections
  - Antibiotic usage
  - Hemodialysis

# Example MRSA Projects

- MRSA 1
  - Reduction in C.Diff. Infections in Regional Collaborative of Inpatient Healthcare Settings
    - \$1 M
- MRSA 2
  - Reducing the Overuse of Antibiotics by PCP Treating Patients in Ambulatory & Long-term Care Settings
    - \$2 M
- MRSA 3
  - REDUCE MRSA: Randomized Evaluation of Decolonization vs. Universal Clearance to Eliminate MRSA
    - \$1.5 M

# MRSA 3

- Large, simple, cluster-randomized trial comparing clinical effectiveness of:
  - Targeted approach based on screening patients for MRSA colonization to guide use of decolonization regimens
  - More uniform approach (topical chlorhexidine bathing) applied to all patients admitted to the ICU
- Collaborative relationship & in-kind contribution from 160-facility Hospital Corporation of America (HCA)

# CUSP/CLABSI Projects

- 2008 – \$3 M to HRET/ACTION to replicate Keystone CUSP/CLABSI in 10 States
  - Validate methods of reducing CLABSI in ICUs in 10 states over three-year period (CA, CO, FL, MA, NE, NC, OH, PA, TX, VA)
- 2009 - \$8 M for 5 additional projects

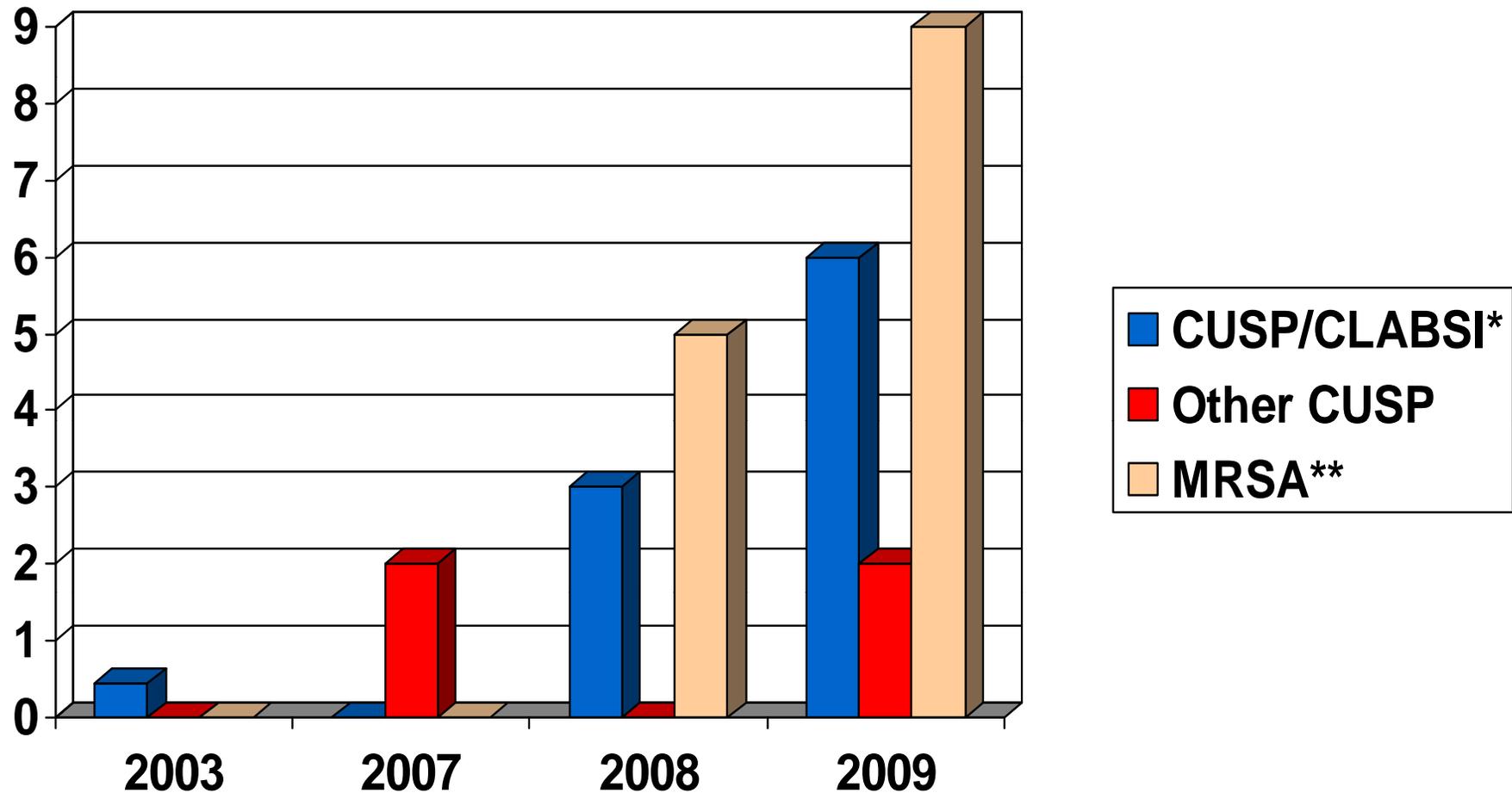
# 2009 CUSP/CLABSI Projects

- Additional \$6 M to ACTION/HRET;  
collaboration with Peter Pronovost/JHU
- Expansion to:
  - More hospitals in existing 10 states
  - 22 additional states, the District of Columbia, & Puerto Rico
  - Outside of the ICU & to ambulatory settings
- Including JHU collaboration, reach 50 states

# Additional 2009 Projects

- Modify CUSP protocol & materials to be applied to CAUTI
  - \$1 M
- Prevent blood stream infections among outpatient hemodialysis patients
  - Study of comparative effectiveness
    - Standard recommended practices
    - Antibiotic and/or antiseptic catheter locks for
  - \$1 M

# AHRQ HAI Investments



\* CUSP = Comprehensive Unit-based Safety Program

\*\* Includes other related infections

# 2010 Focus

- Expand and strengthen statewide collaboratives, all units/hospitals, to reduce HAIs
- Expand efforts to eliminate HAIs in ambulatory settings, including: dialysis centers, outpatient clinics, surgery centers, and nursing homes
- Fund investigator-initiated research aimed at identifying new interventions to reduce HAIs

# Process

- Received 52 submissions for potential projects from interagency HAI work group members & AHRQ contractors
- Will reduce the 52 projects to ~ 12 for review by interagency HAI work group
- Will submit for review & approval by AHRQ's Senior Leadership Team (SLT)

# Criteria for Project Review

- Alignment with the DHHS *HAI National Action Plan* Tier I, II, & III priorities
- Scientific merit
- Generalizability
- Balance with HAI projects funded in 2008 & 2009

# Future Plans

- Maintain alignment with *Action Plan*
- Continue rollout of CLABSI nationwide
- Promote best practices & research findings via proven techniques
- Align HAI efforts with those of Patient Safety Organizations (PSOs), which are collecting data on adverse events using AHRQ's "Common Formats"

# FACT SHEET

## AHRQ's Efforts to Prevent and Reduce Health Care-Associated Infections

The mission of AHRQ is to improve the quality, safety, efficiency, and effectiveness of health care by:

- Using evidence to improve health care.
- Improving health care outcomes through research.
- Transforming research into practice.

### Introduction

Health care-associated infections (HAIs) are infections that patients get while receiving treatment for another condition in some type of health care facility. A study of patients in 2002 estimated that HAIs account for an estimated 1.7 million infections and 99,000 associated deaths annually, making them the most common complication of hospital care. The added financial burden attributable to HAIs is estimated to be between \$28 to \$33 billion each year.

To address this growing problem, the Agency for Healthcare Research and Quality (AHRQ) has funded and collaborated with other Federal agencies on projects that prevent and reduce HAIs. These projects are primarily funded through existing AHRQ mechanisms.

In addition to outlining AHRQ's role in the U.S. Department of Health and Human Services' (HHS) efforts to reduce and prevent HAIs, this fact sheet highlights the Agency's plans for future HAI projects, provides a comprehensive overview of AHRQ's initiatives, and

### Acronyms

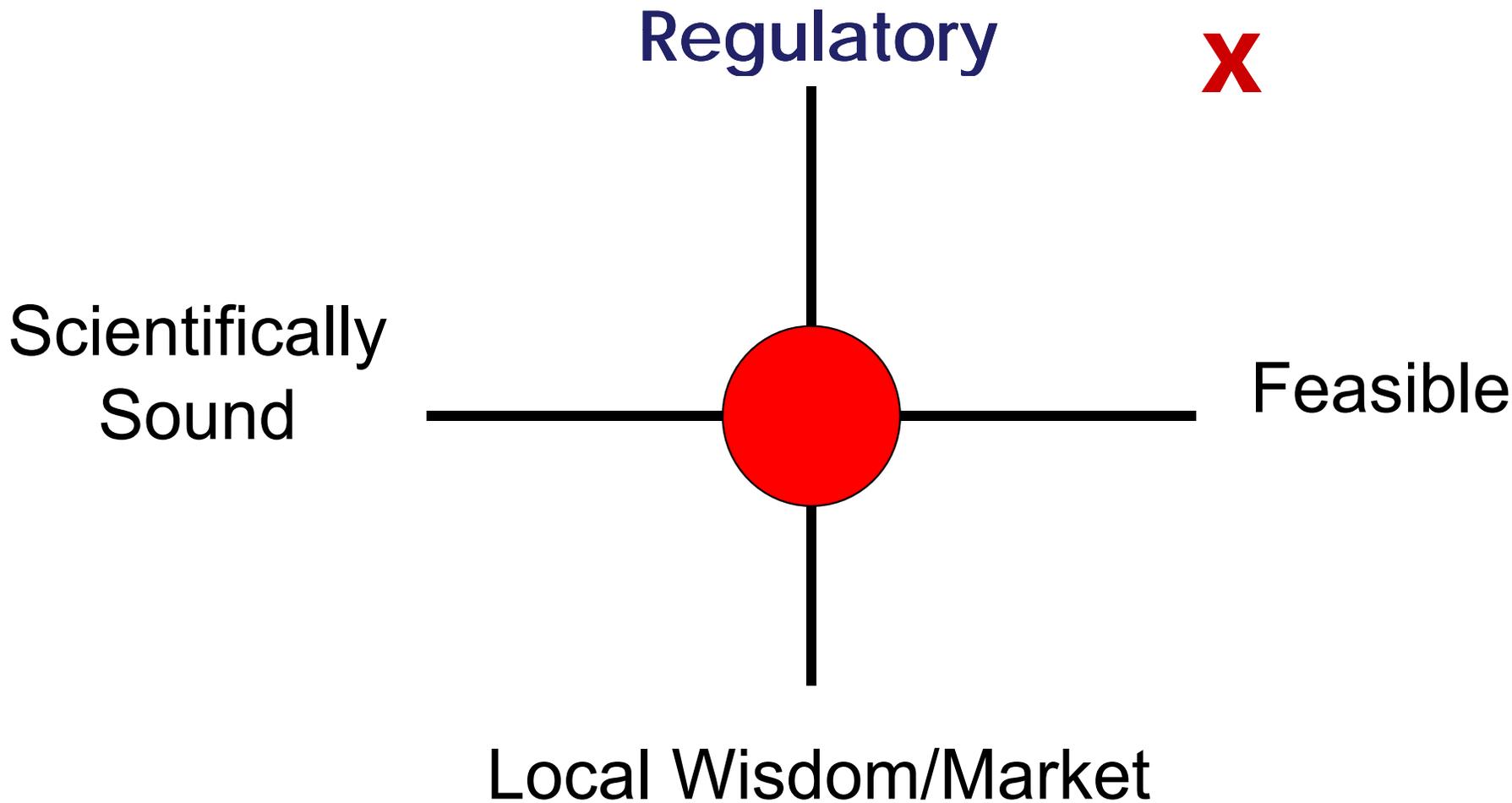
ACTION—Accelerating Change and Transformation in Organizations and Network  
AHRQ—Agency for Healthcare Research and Quality  
BSI—blood stream infection  
CAUTI—catheter-associated urinary tract infection  
CDC—Centers for Disease Control and Prevention  
CLABSI—central line-associated blood stream infection  
CMS—Centers for Medicare & Medicaid Services  
CUSP—Comprehensive Unit-based Safety Program  
HAI—Health care-associated infection  
HHS—U.S. Department of Health and Human Services  
HCUP—Healthcare Cost and Utilization Project  
ICU—intensive care unit  
ICUSRS—Intensive Care Unit Safety Reporting System  
KPC—*Klebsiella pneumoniae* Carbapenemase  
MRSA—methicillin-resistant *Staphylococcus aureus*  
PSO—Patient Safety Organization  
SSI—surgical site infection  
VAP—ventilator-associated pneumonia

# For Additional Information:

- <http://www.ahrq.gov>
- [William.Munier@ahrq.hhs.gov](mailto:William.Munier@ahrq.hhs.gov)

# Overview of STOP-BSI Program

## Peter Pronovost, MD, PhD



# Goals

- To work to eliminate central line associated blood stream infections (CLABSI); state mean < 1/1000 catheter days, median 0
- To improve safety culture
- To learn from one defect per month

# Project Organization

- National leadership from HHS, CDC, AHRQ, CMS
- State wide collaborative with AHA, HRET, MHA, JHU, State Hospital Associations, State Health Departments, QIO, ICPs
- Standardized data collection tools and evidence
- Local modification of how to implement interventions
- Now all 50 states and several countries

# Measure



## **CUSP** Comprehensive Unit based Safety program

1. Educate staff on science of safety
2. Identify defects
3. Assign executive to adopt unit
4. Learn from one defect per quarter
5. Implement teamwork tools

## **(TRiP)** Translating Evidence Into Practice

1. Summarize the evidence in a checklist
2. Identify local barriers to implementation
3. Measure performance
4. Ensure all patients get the evidence



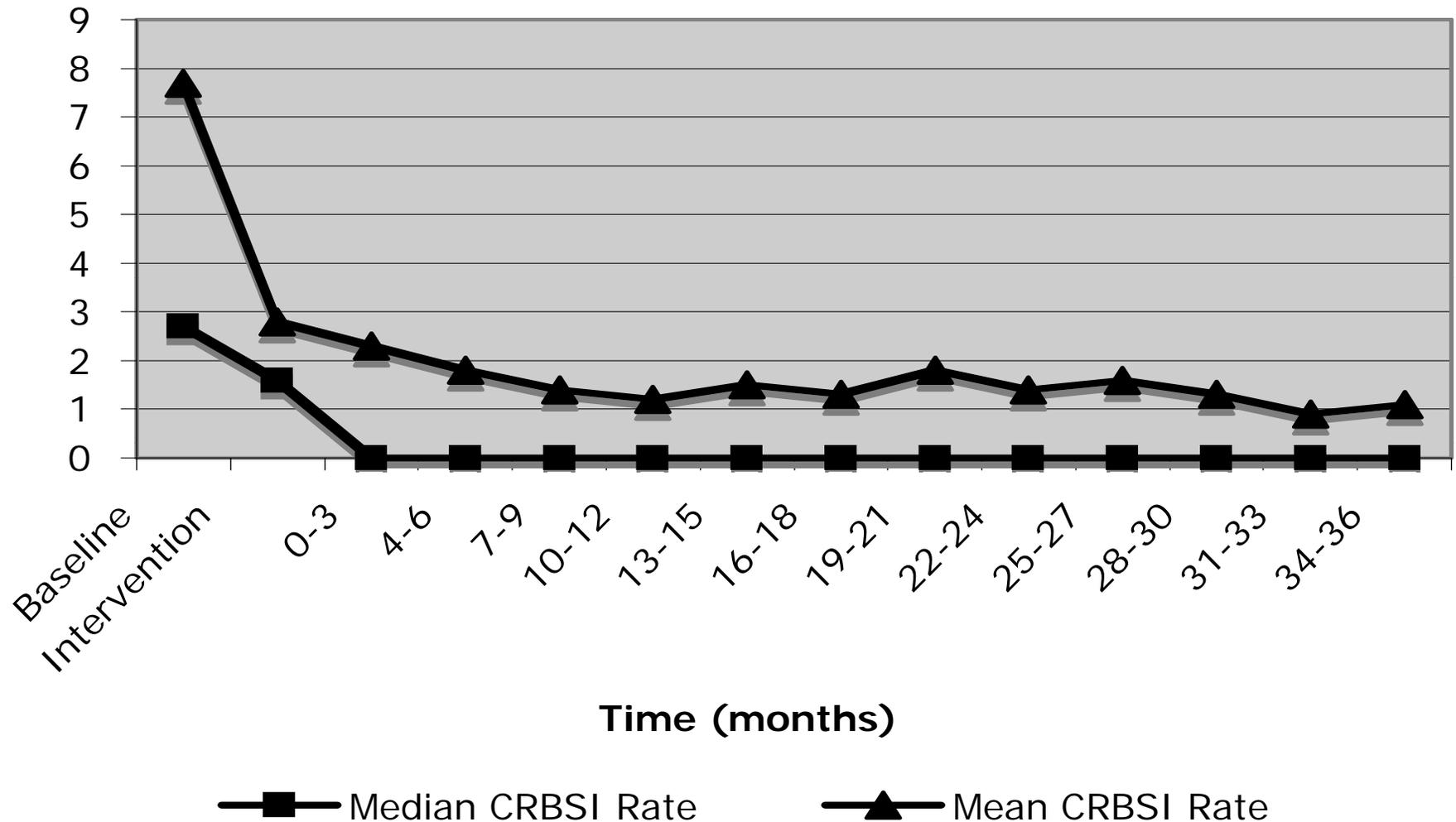
# IMPROVE

# CRBSI Rate Summary Data

Study Period	No. of ICUs	No. of In fections	Cathete r Days	Infection Rate		IRR (95 % CI)
				Median (Q1, Q3)	Mean (SD)	
Base line	55	2 ( 1, 3)	551 (220 , 1091)	2.7 ( 0.6, 4.8)	7.7 (2 8.9)	Re fere nce
Dur ing Implementation	96	1 ( 0, 2)	447 (237 , 710)	1.6 ( 0, 4.4)	2.8 ( 4.0)	0.81 ( 0.61 , 1.0 8)
<b>After Implementation</b>						
<b>Initia l Eva luati on Period</b>						
0-3 mo	95	0 ( 0, 2)	436 (246 , 771)	0 ( 0, 3.0)	2.3 ( 4.0)	0.68 ( 0.53 , 0.8 8)
4-6 mo	95	0 ( 0, 1)	460 (228 , 743)	0 ( 0, 2.7)	1.8 ( 3.2)	0.62 ( 0.42 , 0.9 0)
7-9 mo	96	0 ( 0, 1)	467 (252 , 725)	0 ( 0, 2.0)	1.4 ( 2.8)	0.52 ( 0.38 , 0.7 1)
10-12 mo	95	0 ( 0, 1)	431 (249 , 743)	0 ( 0, 2.1)	1.2 ( 1.9)	0.48 ( 0.33 , 0.7 0)
13-15 mo	95	0 ( 0, 1)	404 (158 , 695)	0 ( 0, 1.9)	1.5 ( 4.0)	0.48 ( 0.31 , 0.7 6)
16-18 mo	95	0 ( 0, 1)	367 (177 , 682)	0 ( 0, 2.4)	1.3 ( 2.4)	0.38 ( 0.26 , 0.5 6)
<b>Sustainabi lity Period</b>						
19-21 mo	89	0 ( 0, 1)	399 (230 , 680)	0 ( 0, 1.4)	1.8 ( 5.2)	0.34 ( 0.23 , 0.5 0)
22-24 mo	89	0 ( 0, 1)	450 (254 , 817)	0 ( 0, 1.6)	1.4 ( 3.5)	0.33 ( 0.23 , 0.4 8)
25-27 mo	88	0 ( 0, 1)	481 (266 , 769)	0 ( 0, 2.1)	1.6 ( 3.9)	0.44 ( 0.34 , 0.5 7)
28-30 mo	90	0 ( 0, 1)	479 (253 , 846)	0 ( 0, 1.6)	1.3 ( 3.7)	0.40 ( 0.30 , 0.5 3)
31-33 mo	88	0 ( 0, 1)	495 (265 , 779)	0 ( 0, 1.1)	0.9 ( 1.9)	0.31 ( 0.21 , 0.4 5)
34-36 mo	85	0 ( 0, 1)	456 (235 , 787)	0 ( 0, 1.2)	1.1 ( 2.7)	0.34 ( 0.24 , 0.4 8)

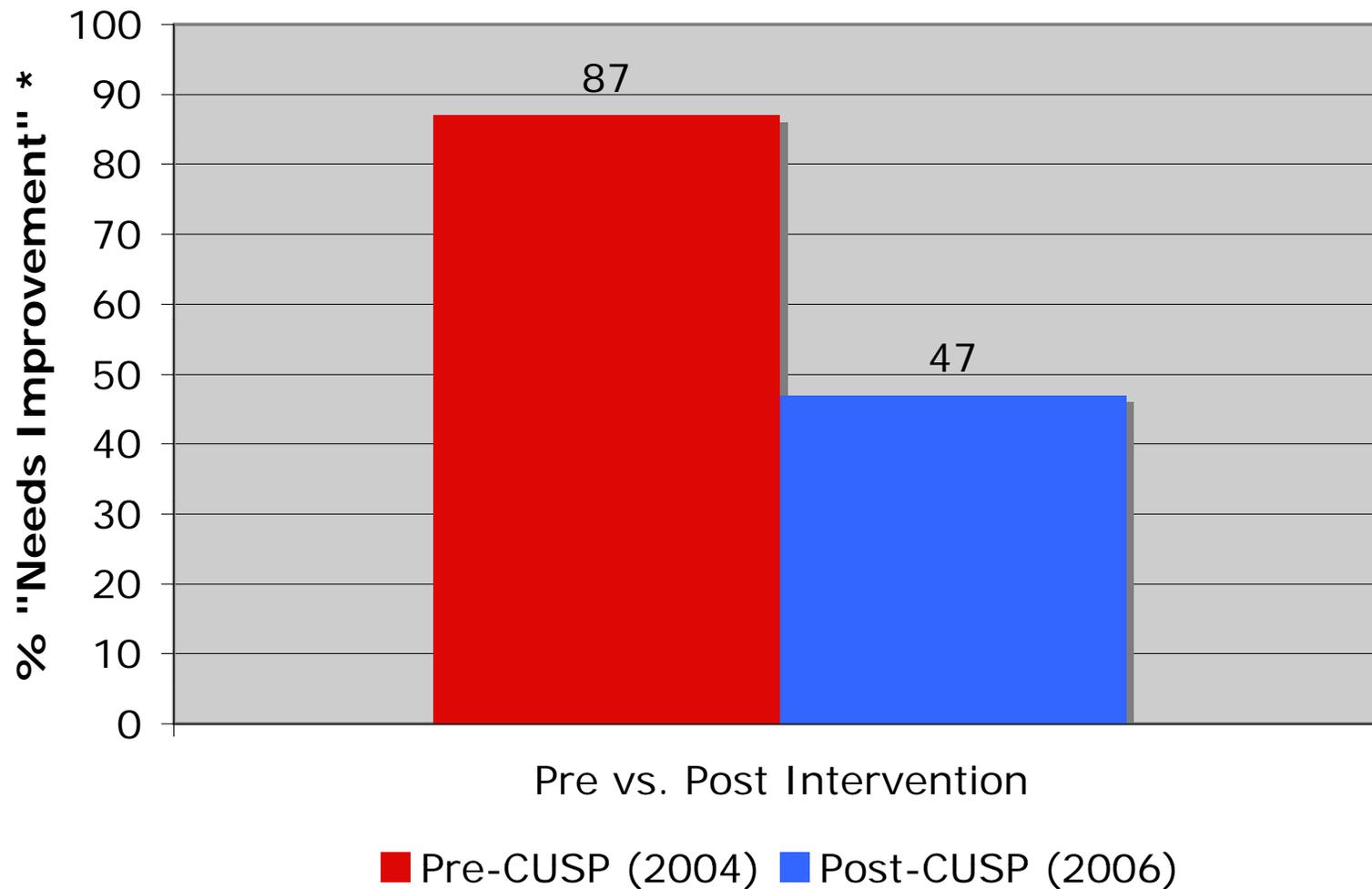
# CRBSI Rate Over Time

## Median and Mean CRBSI Rate



# Michigan ICU Safety Climate Improvement

## Effect of CUSP on Safety Climate



\* "Needs Improvement" - Safety Climate Score <60%

# Challenges

- Recruitment
- Getting technical and adaptive work right
- Data quality and answering did it work
- Invite all to participate and align incentives

# Building Capacity Aligning Forces

- Leadership from Secretary coordinated by HHS
- Align public health model, payment incentives, regulatory, QI, and consumer interests
- Learn how to collaborate from policy to bedside
- Make this the Polio Campaign of our generation
- Develop methods for a pipeline for new programs

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# **Guidelines for Infection Prevention and Control in Healthcare Personnel**

**CDC-HICPAC**

**November 2009**

# Writing Group

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# Should the Document Be Updated I Parts or as a Complete Document?

- Consensus: Complete document
- M. Russi did an informal survey of ACOEM members: prefer a more comprehensive document as a single source

# Outline

- Executive Summary
- Introduction
- Infection Prevention and Control Objectives for Personnel Health Services
- Elements of a Personnel Health Service
  - Coordination with other departments
  - Medical evaluation
  - Personnel Health and Safety Education
  - Immunization programs
  - Management of Job related illness and exposures
  - Health Counseling
  - Maintenance of records, data management and confidentiality

# Outline (continued)

- Epidemiology and control of selected infections transmitted among healthcare personnel and patients
  - **Bloodborne pathogens**
  - Conjunctivitis
  - CMV
  - Diphtheria
  - **GI infections, acute (? Add norovirus)**
  - Hepatitis A
  - HSV
  - **Measles**
  - **Meningococcal disease**

# Outline (continued)

- Epidemiology and control of selected infections transmitted among healthcare personnel and patients (continued)
  - **Mumps**
  - Parvovirus
  - **Pertussis**
  - Poliomyelitis
  - **Rabies**
  - **Rubella**
  - **Scabies and pediculosis**
  - ***Staphylococcus aureus* infection and carriage**

# Outline (continued)

- Epidemiology and control of selected infections transmitted among healthcare personnel and patients (continued)
  - Streptococcus Group A infection
  - **Tuberculosis (add XDR, BAMT)**
  - Vaccinia (smallpox)
  - **Varicella**
  - Viral Respiratory infections (**add SARS**)
    - RSV
    - **Influenza**
    - Work restrictions

# Outline (continued)

- **Pregnant Personnel**
- **Laboratory personnel**
- **Emergency Response personnel**
- Latex hypersensitivity (**? Delete**)
- Americans with Disability Act

# Outline (continued)

## Recommendations

- Introduction
- Elements of a personnel health service for infection control
- Protection of personnel and other patients from patients with infections
- Immunization of Healthcare personnel, general recommendations
- Prophylaxis and follow up after exposure, general recommendations
- Personnel restriction because of infections or special conditions, general recommendations

# Outline (continued)

## Recommendations

- Prevention of nosocomial transmission of selected infections
- Special Issues
  - Pregnancy
  - Emergency response employees
  - Personnel linked to outbreaks of bacterial infections
  - Latex hypersensitivity

# “Companion Documents”

- ACIP Immunizations in healthcare personnel
- SHEA Healthcare personnel infection with bloodborne pathogens (to be published soon)

# Process

## 3 Sections

- The basics
- Specific infections
- Specific populations

# Guidelines for the Prevention of Intravascular Catheter-Related Infections

- Does not use GRADE Methodology
- Category IA. Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.
- Category IB. Strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies, and a strong theoretical rationale.
- Category IC. Required by state or federal regulations, rules, or standards.
- Category II. Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale.
- Unresolved issue. Represents an unresolved issue for which evidence is insufficient or no consensus regarding efficacy exists.

# Education, training and staffing

1. Educate healthcare personnel regarding the indications for intravascular catheter use, proper procedures for the insertion and maintenance of intravascular catheters, and appropriate infection control measures to prevent intravascular catheter-related infections [53-61]. Category IA
2. Periodically assess knowledge of and adherence to guidelines for all persons who are involved in the insertion and maintenance of intravascular catheters [53-61]. Category IA

# Education, training and staffing

3. Designate only trained personnel who demonstrate competence for the insertion and maintenance of peripheral and central intravascular catheters. [60-74].  
Category IA
4. Ensure appropriate nursing staff levels in ICUs to minimize the incidence of catheter-related BSIs. Observational studies suggest a ratio of 2:1 in ICUs where nurses are managing patients with CVCs [75-77].  
Category IB

# Site selection:

## Peripheral and midline catheters

1. In adults, use an upper-extremity site for catheter insertion. Replace a catheter inserted in a lower extremity site to an upper extremity site as soon as possible [82, 83]. Category IB
2. In pediatric patients, the upper or lower extremities or the scalp can be used as the catheter insertion site [82, 83]. Category II
3. Select catheters on the basis of the intended purpose and duration of use, known infectious and non-infectious complications (e.g., phlebitis and infiltration), and experience of individual catheter operators [83-85]. Category IB

# Site selection:

## Peripheral and midline catheters

4. Avoid the use of steel needles for the administration of fluids and medication that might cause tissue necrosis, if extravasation occurs [83-85]. Category IA
5. Use a midline catheter or peripherally inserted central catheter (PICC), instead of a short peripheral catheter, when the duration of IV therapy will likely exceed six days [83-85]. Category IB

# Site Selection:

## Central venous catheters

6. Weigh the risk and benefits of placing a central venous device at a recommended site to reduce infectious complications against the risk for mechanical complications (e.g., pneumothorax, subclavian artery puncture, subclavian vein laceration, subclavian vein stenosis, hemothorax, thrombosis, air embolism, and catheter misplacement) [25, 86-101]. Category IA
7. Use a subclavian site, rather than a jugular or a femoral site, in adult patients to minimize infection risk for nontunneled CVC placement [25, 99, 100]. Category IA
8. No recommendation can be made for a preferred site of insertion to minimize infection risk for a tunneled CVC. Unresolved issue

# Site Selection:

## Central venous catheters

9. Place catheters used for hemodialysis and pheresis in a jugular or femoral vein, rather than a subclavian vein, to avoid venous stenosis [101-105]. Category IA
10. Use ultrasound guidance to place central venous catheters to reduce the number of cannulation attempts and mechanical complications if this technology is available [106, 107]. Category 1B
11. Promptly remove any intravascular catheter that is no longer essential [108, 109]. Category IA

# Hand Hygiene and Aseptic Technique

1. Perform hand hygiene procedures, either by washing hands with conventional antiseptic containing soap and water or with waterless alcohol-based hand rubs (ABHR). Hand hygiene should be performed before and after palpating catheter insertion sites as well as before and after inserting, replacing, accessing, repairing, or dressing an intravascular catheter. Palpation of the insertion site should not be performed after the application of antiseptic, unless aseptic technique is maintained [58, 127-131]. Category IA
2. Maintain aseptic technique for the insertion and care of intravascular catheters [25, 132-134]. Category IA

# Hand Hygiene and Aseptic Technique

3. Wear clean gloves, rather than sterile gloves, for the insertion of peripheral intravascular catheters, if the access site is not touched after the application of skin antiseptics. Category IC
4. Sterile gloves should be worn for the insertion of arterial, central, and midline catheters [25, 132-134]; and these gloves should be changed, if a catheter is being exchanged over a guidewire (thereby contaminating the gloves) and a new sterile catheter is then handled. Category IA
5. Wear either clean or sterile gloves when changing the dressing on intravascular catheters. Category IC

# Maximal Sterile Barrier Precautions

1. Use maximal sterile barrier precautions, including the use of a cap, mask, sterile gown, sterile gloves, and a large sterile full body drape, for the insertion of CVCs, PICCs, or guidewire exchange [60, 132, 136, 137].  
Category IB
2. Use a sterile sleeve to protect pulmonary artery catheters during insertion [138]. Category IB

# Skin Preparation

1. Prepare clean skin with 70% alcohol before peripheral venous catheter insertion [139]. Category IA
2. Prepare clean skin site with a 2% chlorhexidine-based preparation before central venous catheter insertion and during dressing changes. If there is a contraindication to chlorhexidine, tincture of iodine, an iodophor, or 70% alcohol can be used as alternatives [140, 141]. Category IA
3. No recommendation can be made for the safety or efficacy of chlorhexidine in infants aged <2 months. Unresolved issue
4. Allow povidone iodine to remain on the skin for at least 2 minutes or longer for the antibacterial properties to take effect, if it is not yet dry before catheter insertion. The antibacterial properties of chlorhexidine work on contact, and chlorhexidine does not require a minimum 2- minute drying time before proceeding. Catheter insertion may begin as soon as the chlorhexidine is dry[140, 141]. Category IB

# Catheter site dressing regimens

1. Use either sterile gauze or sterile, transparent, semi-permeable dressing to cover the catheter site [146-149]. Category IA
2. If the patient is diaphoretic or if the site is bleeding or oozing, use gauze dressing until this is resolved [146-149]. Category II
3. Replace catheter site dressing if the dressing becomes damp, loosened, or visibly soiled [146, 147]. Category IB
4. Do not use topical antibiotic ointment or creams on insertion sites, except for dialysis catheters, because of their potential to promote fungal infections and antimicrobial resistance [150, 151]. Category IB

# Catheter site dressing regimens

5. Do not submerge the catheter or catheter site in water. Showering should be permitted if precautions can be taken to reduce the likelihood of introducing organisms into the catheter (e.g., if the catheter and connecting device are protected with an impermeable cover during the shower) [152, 153]. Category II
6. Replace dressings used on short-term CVC sites every 2 days for gauze dressings and at least every 7 days for transparent dressings, except in those pediatric patients in which the risk for dislodging the catheter may outweigh the benefit of changing the dressing [149]. Category IB
7. Replace dressings used on tunneled or implanted CVC sites no more than once per week, until the insertion site has healed [149]Category IB
8. No recommendation can be made regarding the necessity for any dressing on well-healed exit sites of long-term cuffed and tunneled CVCs. Unresolved issue

# Catheter site dressing regimens

9. Ensure that catheter site care is compatible with the catheter material [154, 155]. Category IB
10. Use a sterile sleeve for all pulmonary artery catheters [138]. Category IB
11. Use a chlorhexidine-impregnated sponge dressing for temporary short-term catheters in patients older than 2 months of age, if the CRBSI rate is higher than the institutional goal, despite adherence to basic CRBSI prevention measures, including education and training, use of chlorhexidine for skin antisepsis, and MSB [22, 156-158]. Category 1B

# Patient Cleansing

- Use a 2% chlorhexidine wash daily to reduce CRBSI [162]. Category II

# Catheter Securement Devices

- Use a sutureless securement device to reduce the risk of infection for PICCs [163]. Category II

# Antimicrobial/Antiseptic Impregnated Catheters and Cuffs

- Use a chlorhexidine/silver sulfadiazine or minocycline/rifampin -impregnated CVC in adults whose catheter is expected to remain in place >5 days if, after successful implementation of a comprehensive strategy to reduce rates of CRBSI, the CRBSI rate remains above the goal set by the individual institution based on benchmark rates (Tables 2 and 3) and local factors. The comprehensive strategy should include at least the following three components: educating persons who insert and maintain catheters, use of maximal sterile barrier precautions, and a 2% chlorhexidine preparation for skin antisepsis during CVC insertion. Category IA

# Systemic Antibiotic Prophylaxis

- **Do not administer systemic antimicrobial prophylaxis routinely before insertion or during use of an intravascular catheter to prevent catheter colonization or CRBSI [188].  
Category IA**

# Antibiotic/Antiseptic Ointments

- **Use povidone iodine antiseptic ointment or bacitracin/neomycin/polymyxin B ointment at the hemodialysis catheter exit site after catheter insertion and at the end of each dialysis session only if this ointment does not interact with the material of the hemodialysis catheter per manufacturer's recommendation [139, 194-198]. Category IB**

# Antibiotic Lock Prophylaxis, Antimicrobial Catheter Flush and Catheter Lock Prophylaxis

- Use prophylactic antimicrobial lock solution in patients with long term catheters who have a history of multiple CRBSI despite optimal maximal adherence to aseptic technique [23, 211-228]. Category II

# Anticoagulants

- Do not routinely use anticoagulant therapy to reduce the risk of catheter-related infection in general patient populations [234]. Category II

# Replacement of Peripheral and Midline Catheters

1. Replace peripheral catheters every 72-96 hours to reduce risk of infection and phlebitis in adults. Category 1B
2. Replace peripheral catheters in children only when clinically indicated [82, 83]. Category 1B
3. Replace midline catheters only when there is a specific indication. Category II

# Replacement of CVCs, Including PICCs and Hemodialysis Catheters

1. Do not routinely replace CVCs, PICCs, hemodialysis catheters, or pulmonary artery catheters to prevent catheter-related infections. Category IB
2. Do not remove CVCs or PICCs on the basis of fever alone. Use clinical judgment regarding the appropriateness of removing the catheter if infection is evident elsewhere or if a noninfectious cause of fever is suspected. Category II
3. Do not use guidewire exchanges routinely for non-tunneled catheters to prevent infection. Category IB

# Replacement of CVCs, Including PICCs and Hemodialysis Catheters

4. Do not use guidewire exchanges to replace a non-tunneled catheter suspected of infection. Category IB
5. Use a guidewire exchange to replace a malfunctioning non-tunneled catheter if no evidence of infection is present. Category IB
6. Use new sterile gloves before handling the new catheter when guidewire exchanges are performed. Category II

# Umbilical Catheters

1. Remove and do not replace umbilical artery catheters if any signs of CRBSI, vascular insufficiency, or thrombosis are present [278]. Category II
2. Remove and do not replace umbilical venous catheters if any signs of CRBSI or thrombosis are present [278]. Category II
3. No recommendation can be made for treating through an umbilical venous catheter suspected of being infected. Unresolved issue
4. Replace umbilical venous catheters only if the catheter malfunctions. Category II

# Umbilical Catheters

5. Cleanse the umbilical insertion site with an antiseptic before catheter insertion. Avoid tincture of iodine because of the potential effect on the neonatal thyroid. Other iodine-containing products (e.g., povidone iodine) can be used [279-283]. Category IB
6. Do not use topical antibiotic ointment or creams on umbilical catheter insertion sites because of the potential to promote fungal infections and antimicrobial resistance [150, 151]. Category IA
7. Add low doses of heparin (0.25-1.0 U/ml) to the fluid infused through umbilical arterial catheters [284-286]. Category IB
8. Remove umbilical catheters as soon as possible when no longer needed or when any sign of vascular insufficiency to the lower extremities is observed. Optimally, umbilical artery catheters should not be left in place >5 days [278, 287]. Category II
9. Umbilical venous catheters should be removed as soon as possible when no longer needed, but can be used up to 14 days if managed aseptically [288, 289]. Category II

# Peripheral Arterial Catheters and Pressure Monitoring Devices for Adult and Pediatric Patients

1. In adults, use of the radial, brachial or dorsalis pedis sites is preferred over the femoral or axillary sites of insertion to reduce the risk of infection [94, 95, 292, 293]. Category IB
2. In children, the brachial site should not be used. The radial, dorsalis pedis, and posterior tibial sites are preferred over the femoral or axillary sites of insertion [94]. Category II
3. A cap, mask, sterile gloves and a large sterile fenestrated drape should be used during peripheral arterial catheter insertion [95, 293]. Category IB
4. During axillary or femoral artery catheter insertion, maximal sterile barriers precautions should be used. Category II

# Peripheral Arterial Catheters and Pressure Monitoring Devices for Adult and Pediatric Patients

5. Replace arterial catheters only when there is a clinical indication. Category II
6. Remove the arterial catheter as soon as it is no longer needed. Category II
7. Use disposable, rather than reusable, transducer assemblies when possible [294-298]. Category IB
8. Do not routinely replace arterial catheters to prevent catheter-related infections [262, 276, 299, 300]. Category II

# Peripheral Arterial Catheters and Pressure Monitoring Devices for Adult and Pediatric Patients

9. Replace disposable or reusable transducers at 96-hour intervals. Replace other components of the system (including the tubing, continuous-flush device, and flush solution) at the time the transducer is replaced [25, 295]. Category IB
10. Keep all components of the pressure monitoring system (including calibration devices and flush solution) sterile [294, 301-303]. Category IA
11. Minimize the number of manipulations of and entries into the pressure monitoring system. Use a closed flush system (i.e., continuous flush), rather than an open system (i.e., one that requires a syringe and stopcock), to maintain the patency of the pressure monitoring catheters [297, 304]. Category II

# Peripheral Arterial Catheters and Pressure Monitoring Devices for Adult and Pediatric Patients

12. When the pressure monitoring system is accessed through a diaphragm, rather than a stopcock, wipe the diaphragm with an appropriate antiseptic before accessing the system [297]. Category IA
13. Do not administer dextrose-containing solutions or parenteral nutrition fluids through the pressure monitoring circuit [297, 305, 306]. Category IA
14. Sterilize reusable transducers according to the manufacturers' instructions if the use of disposable transducers is not feasible [297, 305-308]. Category IA

# Replacement of Administration Sets

1. In patients not receiving blood, blood products or lipid emulsions, replace administration sets, including secondary sets and add-on devices, no more frequently than at 96-hour intervals, [313] but at least every 7 days [255, 314-316]. Category IA
2. Replace tubing used to administer blood, blood products, or lipid emulsions (those combined with amino acids and glucose in a 3-in-1 admixture or infused separately) within 24 hours of initiating the infusion [317-320]. Category IB
3. Replace tubing used to administer propofol infusions every 6 or 12 hours, when the vial is changed, per the manufacturer's recommendation (FDA website Medwatch) [321]. Category IA

# Needleless Intravascular Catheter Systems

1. Change the needleless components at least as frequently as the administration set. There is no benefit to changing these more frequently than every 72 hours [87, 328-334]. Category II
2. Change caps no more frequently than every 72 hours for the purpose of reduced infection rates or according to manufacturers' recommendations[328, 330, 333, 334]. Category II
3. Ensure that all components of the system are compatible to minimize leaks and breaks in the system[335]. Category II
4. Minimize contamination risk by wiping the access port with an appropriate antiseptic (chlorhexidine preferred) and accessing the port only with sterile devices [330, 333, 335]. Category IA
5. Use a needleless system to access IV tubing. Category IC
6. When needleless systems are used, the split septum valve is preferred over the mechanical valve due to increased risk of infection [336-339]. Category II

# Multidose Parenteral Medication Vials and Parenteral Fluids

1. Mix all routine parenteral fluids in the pharmacy in a laminar flow hood using aseptic technique [347, 348].  
Category IB
2. Do not use any container of parenteral fluid that has visible turbidity, leaks, cracks, particulate matter, or if the manufacturer's expiration date has passed [348].  
Category IB
3. Use single dose vials for parenteral additives or medications when possible [348, 349]. Category II
4. Do not combine the leftover content of single use vials for later use [348, 349]. Category IA

# Multidose Parenteral Medication Vials and Parenteral Fluids

5. If multidose vials are used, refrigerate multidose vials after they are opened if recommended by the manufacturer [348]. Category II
6. Cleanse the access diaphragm of multidose vials with 70% alcohol before inserting a device into the vial [350]. Category IA
7. Use a sterile device to access a multidose vial and avoid touch contamination of the device before penetrating the access diaphragm [351, 352]. Category IA
8. Discard multidose vial if sterility is compromised [351, 352]. Category IA
9. All multidose vials should be dated when 1st used and thereafter not used beyond the manufacturer's stated expiration period. Category IC

# Multidose Parenteral Medication Vials and Parenteral Fluids

10. Use the needle and syringe to access the multidose vial only once and to then discard both safely. This applies to each and every dose withdrawn from the vial [351, 352]. Category IA
11. Complete the infusion of lipid-containing solutions (e.g., 3-in-1 solutions) within 24 hours of hanging the solution [317, 318, 326, 327, 353] Category IB
12. Complete the infusion of lipid emulsions alone within 12 hours of hanging the emulsion. If volume considerations require more time, the infusion should be completed within 24 hours [317, 326, 327]. Category IB
13. Complete infusions of blood or other blood products within 4 hours of hanging the blood [354-357]. Category II
14. No recommendation can be made for the hang time of other parenteral fluids. Unresolved issue

# Performance Improvement

- Use hospital-specific or collaborative-based performance improvement initiatives in which multifaceted strategies are "bundled" together improve compliance with evidence-based recommended practices [61, 108, 109, 362-366].  
Category 1B

# Questions

# Questions

- 1). Page 13: Select catheters on the basis of the intended purpose and duration of use, known infectious and non-infectious complications (e.g., phlebitis and infiltration), and experience of individual catheter operators [83-85]. Category IB  
*\*\* References do not seem to support statement (83, 84 discuss steel needle use, 85 a review article about general catheter use)*
  
- 2). Page 13: Use a midline catheter or peripherally inserted central catheter (PICC), instead of a short peripheral catheter, when the duration of IV therapy will likely exceed six days [83-85]. Category IB  
*\*\* References do not seem to support statement (83, 84 discuss steel needle use, 85 a review article about general catheter use)*
  
- 3). Page 18: Use maximal sterile barrier precautions, including the use of a cap, mask, sterile gown, sterile gloves, and a large sterile full body drape, for the insertion of CVCs, PICCs, or guidewire exchange [60, 132, 136, 137]. Category IB  
*\*\* This was a 1A in previous version of the guideline. In addition, should the terminology be “large sterile full body drape” or “large sterile drape”?*

# Questions

- 4). Page 20: Do not use topical antibiotic ointment or creams on insertion sites, except for dialysis catheters, because of their potential to promote fungal infections and antimicrobial resistance [150, 151]. Category IB  
*\*\* This appears to be 2 recommendations (1 for and 1 against antibiotic ointment use). Should they both be 1B (i.e., not for routine use, may be used for dialysis catheters)?*
- 5). Page 21:
6. Replace dressings used on short-term CVC sites every 2 days for gauze dressings and at least every 7 days for transparent dressings, except in those pediatric patients in which the risk for dislodging the catheter may outweigh the benefit of changing the dressing [149]. Category IB
7. Replace dressings used on tunneled or implanted CVC sites no more than once per week, until the insertion site has healed [149]Category IB  
*\*\*This cited study (#149) evaluated 2 vs. 5 days for short-term catheters (non-tunneled) catheters and 5 vs. 10 days for tunneled catheters (transparent polyurethane dressings used)—no differences were found. Should the time periods studied be reflected in the document?*
- 6). Page 25: Use a chlorhexidine/silver sulfadiazine or minocycline/rifampin -impregnated CVC in adults whose catheter is expected to remain in place >5 days if, after successful implementation of a comprehensive strategy to reduce rates of CRBSI, the CRBSI rate remains above the goal set by the individual institution based on benchmark rates (Tables 2 and 3) and local factors. The comprehensive strategy should include at least the following three components: educating persons who insert and maintain catheters, use of maximal sterile barrier precautions, and a 2% chlorhexidine preparation for skin antisepsis during CVC insertion. Category IA  
*\*\* No references included with this on page 25. Does current literature warrant change from 1B to 1A? Similar recommendation for urinary catheters is a 1B (in CAUTI guidelines).*

# Questions

- 7). Page 31: Use prophylactic antimicrobial lock solution in patients with long term catheters who have a history of multiple CRBSI despite optimal maximal adherence to aseptic technique [23, 211-228]. Category II  
*\*\* Does the evidence support a higher recommendation and a broader use similar to that described for antimicrobial impregnated catheters (i.e., if “tier 1” efforts fail to decrease rates)?*
- 8). Page 40: If temporary access is needed for dialysis, a cuffed catheter is preferable to a non-cuffed catheter, even in the ICU setting, if the catheter is expected to stay in place for >3 weeks [198].  
*\*\*This cites 2000 KDOQI recommendations. Updated 2006 KDOQI recommendations state that uncuffed dialysis catheters should only be for hospitalized patients and should be used for less than 1 week.*
- 9). Page 44: A cap, mask, sterile gloves and a large sterile fenestrated drape should be used during peripheral arterial catheter insertion [95, 293]. Category IB  
*\*\* Do these references support this being a 1B recommendation? #95 compares peripheral arterial catheters to CVCs with cap, gloves, mask, gown and sterile drape. #293 required gloves and a large sterile drape and found low rates (no real comparison group) of BSIs. In addition, this seems to contradict a randomized trial (#309) which found no difference between maximal barrier precautions and less rigorous precautions. Also, this seems to contradict this statement in the supporting text “Unlike CVCs, use of full barrier precautions during arterial cannulation does not appear to reduce the risk of arterial CRBSI [293, 309].”*

# Questions

- 10). Page 48: Minimize contamination risk by wiping the access port with an appropriate antiseptic (chlorhexidine preferred) and accessing the port only with sterile devices [330, 333, 335]  
*\*\*These three references do not appear to support the statement that chlorhexidine is preferred. In addition, these 3 references from 3 outbreak investigations do not appear to describe or show an association with failure to wipe the access port and infection.*
- 11). Page 45: Sterilize reusable transducers according to the manufacturers' instructions if the use of disposable transducers is not feasible [297, 305-308]. Category IA  
*\*\*Should this be a 1C recommendation?*
- 12). Page 46: 3. Replace tubing used to administer propofol infusions every 6 or 12 hours, when the vial is changed, per the manufacturer's recommendation (FDA website Medwatch) [321]. Category IA  
*\*\* Should this be a 1C recommendation?*

# Aseptic Handling of Parenteral Fluids and Medication Vials (Rewording of Multidose Parenteral Medication Vials and Parenteral Fluids)

Safe injection practices: The following recommendations apply to the use of needles, cannulas that replace needles, and, where applicable intravenous delivery systems (2007 Isolation Guidelines)

## General Practices

1. Use aseptic technique to avoid contamination of sterile injection equipment and medications. Category IA (2007 Isolation Guidelines)
2. Do not administer medications from a syringe to multiple patients, even if the needle or cannula on the syringe is changed. Needles, cannulae and syringes are sterile, single-use items; they should not be reused for another patient nor to access a medication or solution that might be used for a subsequent patient. Category IA (2007 Isolation Guidelines)
3. Use fluid infusion and administration sets (i.e., intravenous bags, tubing and connectors) for one patient only and dispose appropriately after use. Consider a syringe or needle/cannula contaminated once it has been used to enter or connect to a patient's intravenous infusion bag or administration set. Category IB (2007 Isolation Guidelines)
4. Do not use parenteral medications if the manufacturer's expiration date has passed or if sterility is compromised or questionable (e.g., visible turbidity, leaks, cracks, particulate matter). Category IB (Rewording of Catheter Guidelines #2, which said: "Do not use any container of parenteral fluid that has visible turbidity, leaks, cracks, or particulate matter, or if the manufacturer's expiration date has passed. Category IB")

# Aseptic Handling of Parenteral Fluids and Medication Vials

## Single-dose Medications

5. Use single-dose vials for parenteral medications whenever possible. Category IA (2007 Isolation Guidelines. In Cather Guidelines #3 this said “Use single dose vials for parenteral additives or medications when possible. Category II”)
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# Aseptic Handling of Parenteral Fluids and Medication Vials

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- C. Do not keep open multidose vials in the immediate patient treatment area and store in accordance with the manufacturer's recommendations; discard if sterility is compromised or questionable. Category IA (2007 Isolation Guidelines. This would take replace the Catheter Guideline #5 “If multidose vials are used, refrigerate multidose vials after they are opened if recommended by the manufacturer. Category II” and Catheter Guideline #8 “Discard multidose vial if sterility is compromised. Category IA”)
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- F. A needle should never be left inserted into a medication vial septum for multiple uses. Category IA (proposed)

# Aseptic Handling of Parenteral Fluids and Medication Vials

## Infusions

9. Mix all routine parenteral fluids in the pharmacy in a laminar flow hood using aseptic technique. Category IB (This one needs further clarification/explanation and/or consultation with USP 797 as they have additional guidance in this area and on how quickly certain medications must be administered after preparation...particularly if the guideline transitions just to focus on infusion administration and preparation.)
10. Complete the infusion of lipid-containing solutions (e.g., 3-in-1 solutions) within 24 hours of hanging the solution Category IB (Catheter Guideline #11)
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Aseptic Handling of Parenteral Fluids and Medication Vials (Rewording of Catheter Guidelines which was Multidose Parenteral Medication Vials and Parenteral Fluids)  
Safe injection practices: The following recommendations apply to the use of needles, cannulas that replace needles, and, where applicable intravenous delivery systems (2007 Isolation Guidelines)

#### **General Practices**

1. Use aseptic technique to avoid contamination of sterile injection equipment and medications. Category IA (2007 Isolation Guidelines)
2. Do not administer medications from a syringe to multiple patients, even if the needle or cannula on the syringe is changed. Needles, cannulae and syringes are sterile, single-use items; they should not be reused for another patient nor to access a medication or solution that might be used for a subsequent patient. Category IA (2007 Isolation Guidelines)
3. Use fluid infusion and administration sets (i.e., intravenous bags, tubing and connectors) for one patient only and dispose appropriately after use. Consider a syringe or needle/cannula contaminated once it has been used to enter or connect to a patient's intravenous infusion bag or administration set. Category IB (2007 Isolation Guidelines)
4. Do not use parenteral medications if the manufacturer's expiration date has passed or if sterility is compromised or questionable (e.g., visible turbidity, leaks, cracks, particulate matter). Category IB (Rewording of Catheter Guidelines #2, which said: "Do not use any container of parenteral fluid that has visible turbidity, leaks, cracks, or particulate matter, or if the manufacturer's expiration date has passed. Category IB")

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# Multidose Parenteral Medication Vials and Parenteral Fluids

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Category IB
2. Do not use any container of parenteral fluid that has visible turbidity, leaks, cracks, particulate matter, or if the manufacturer's expiration date has passed [348].  
Category IB
3. Use single dose vials for parenteral additives or medications when possible [348, 349]. Category II
4. Do not combine the leftover content of single use vials for later use [348, 349]. Category IA

# Multidose Parenteral Medication Vials and Parenteral Fluids

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# Multidose Parenteral Medication Vials and Parenteral Fluids

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# Update: Guideline for the Prevention and Management of Norovirus Gastroenteritis Outbreaks in Healthcare Settings

Kurt Stevenson, MD, MPH  
Tara MacCannell, MSc, PhD  
Craig Umscheid, MD, MSCE

HICPAC Meeting

Nov 12, 2009

# Norovirus Guideline Working Group

- Core Working Group
  - Tara MacCannell, DHQP, CDC
  - Kurt Stevenson, Ohio State, HICPAC
  - Craig Umscheid, CEP, UPHS
  - Rajender Agarwal, CEP, UPHS
  - Ingi Lee, CEP, UPHS
  - Gretchen Kuntz, CEP, UPHS
- External Review
  - Cliff McDonald, DHQP, CDC
  - Aron Hall, NCIRD, CDC
  - John Boyce, Hospital of St. Raphael, New Haven, CT
- Internal Review
  - Keith Ramsey, HICPAC
  - Alexis Elward, HICPAC

# Key Questions

1. What are the best methods to identify a Norovirus occurrence or outbreak in healthcare settings?
2. What interventions best prevent or contain Norovirus outbreaks in healthcare settings?
3. What patient, virus or environmental characteristics increase or decrease the risk of Norovirus infection in healthcare settings?

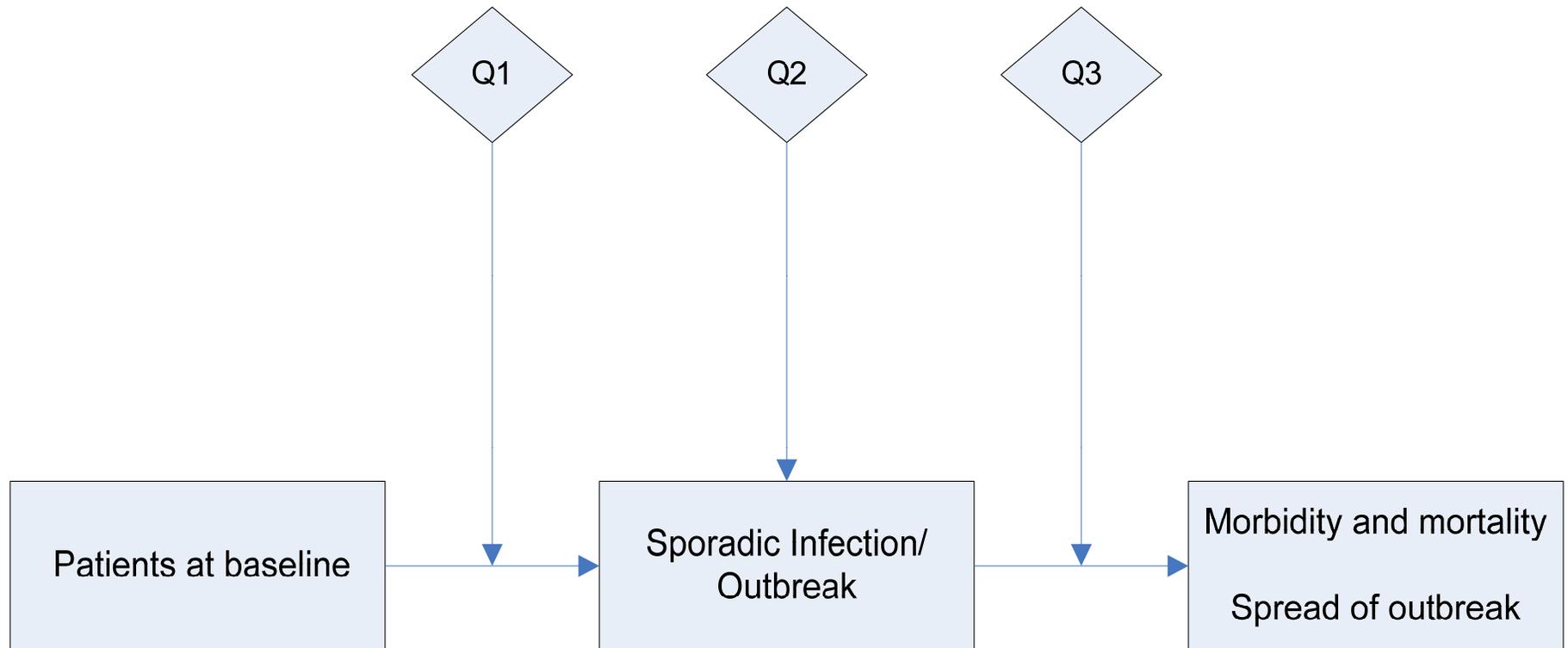
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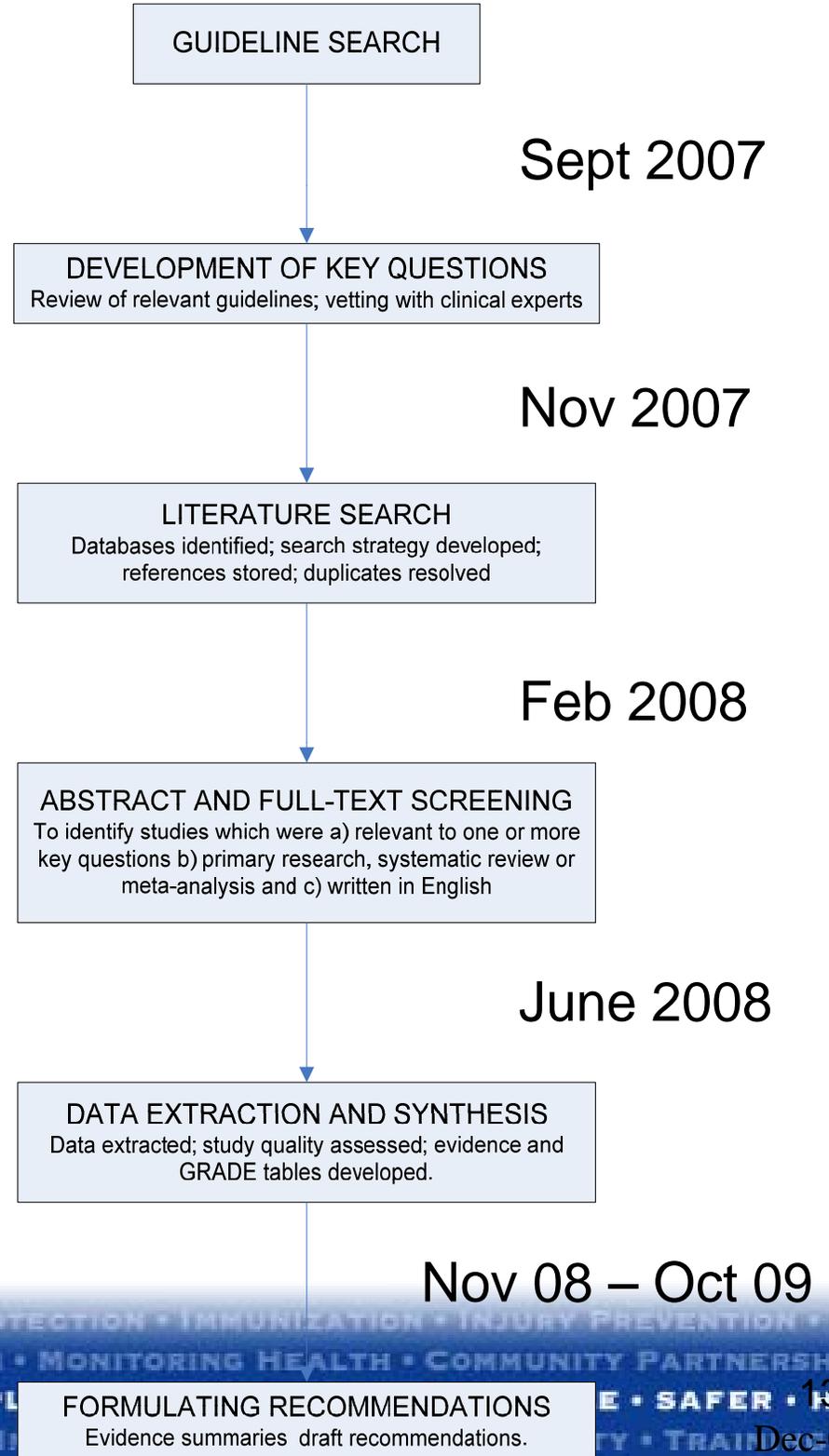
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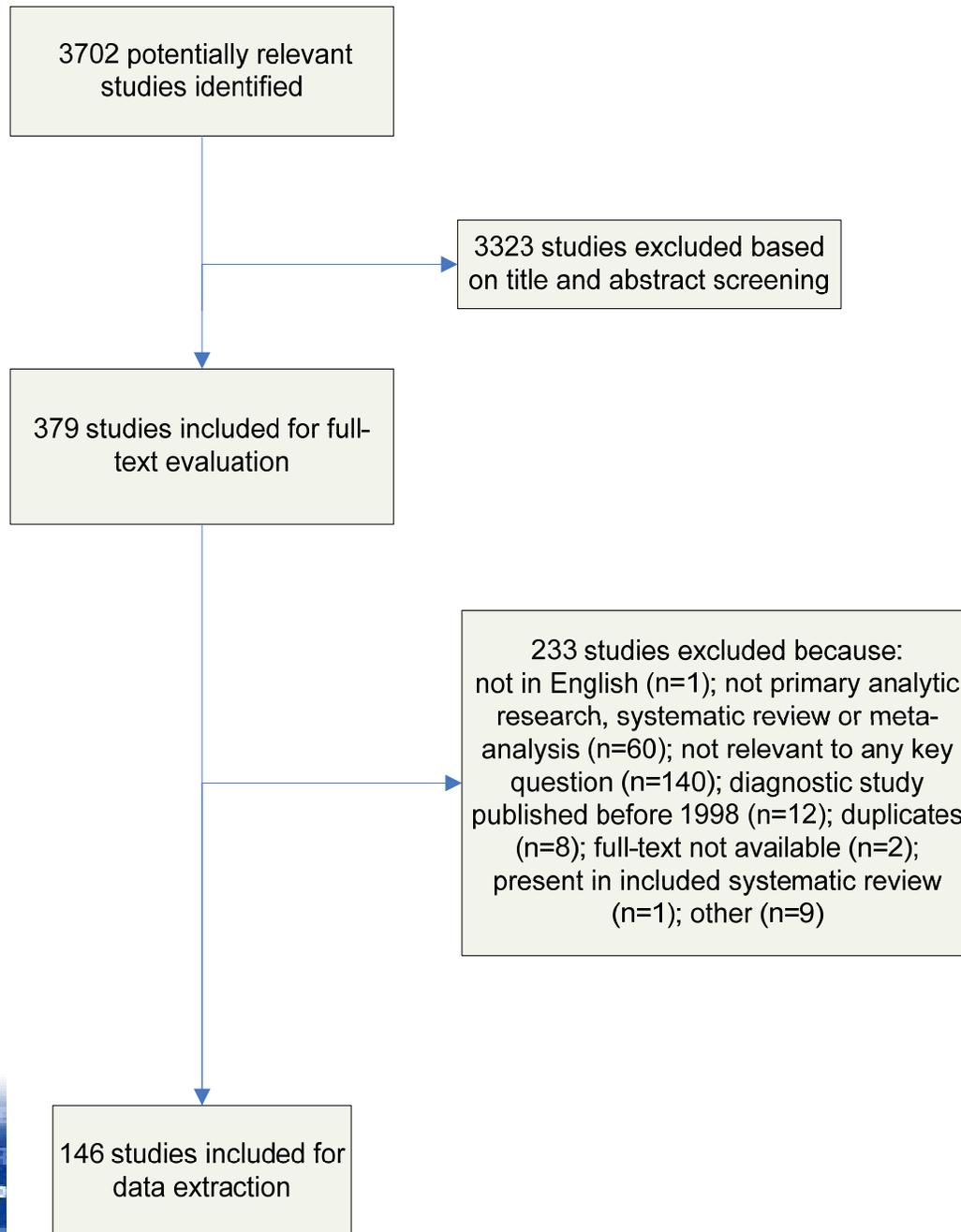
# Analytic Framework for Key Questions



# General Guideline Development Process

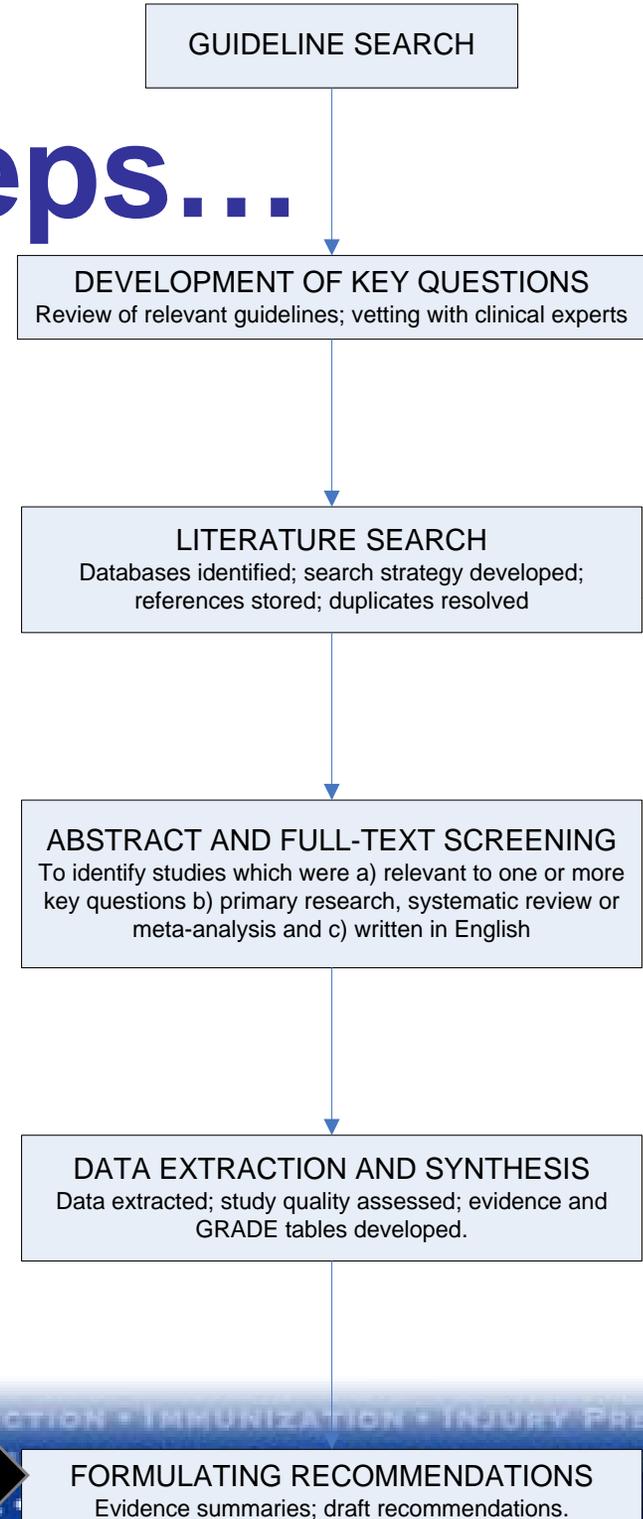


# Flow of final search results



# Recent Steps...

- Completed Background
- Updated Methods
- Completed Summary of Recs
- Completed Implementation and Audit
- Completed Expert Review



Timeframe: Jun - Oct'09

# Recommendation Tiers

- Tier 1 recommendations
  - Category IA-1C  
Recommended infection control activities for clusters or outbreaks of norovirus with epidemiologic or laboratory evidence of local patient and/or staff transmission
- Tier 2 recommendations
  - Category II
  - Activities to consider during periods of uncontrolled norovirus outbreaks with evidence of continued patient and/or staff transmission

# Summary of Recommendations: Topics Covered

- Patient cohorting and isolation precautions
- Hand hygiene
- Personal protective equipment
- Environmental cleaning
- Staff leave and policies
- Indirect patient care staff – Food handlers
- Visitors
- Education
- Active case finding
- Communication activities

# Priority Recommendations

- 1.A.1 Avoid exposure to vomitus or diarrhea by instituting Contact Precautions for patients who exhibit symptoms consistent with a norovirus gastroenteritis cluster or outbreak.

Sporadic cases of norovirus can be managed under Standard Precautions with necessary provisions to reduce staff, visitor, and patient exposures to vomitus or diarrhea. **(Category IB)**  
(Key Question 1A)

- 2.A.1 In the absence of clinical laboratory diagnostics or a delay in obtaining laboratory findings, use Kaplan's clinical and epidemiologic criteria as a tool to raise the index of suspicion of a norovirus outbreak to help institute the appropriate infection control measures in a timely fashion. **(Category IA)** (Key Question 2A)

# Priority Recommendations

- 3.C.3 Facilities should develop policies that address provisions for staff leave among those who develop symptoms consistent with norovirus infection. All affected staff members should be excluded from work until a minimum of 48 hours after the resolution of symptoms. Once staff return to work, strict adherence to hand hygiene must be maintained. **(Category IB)** (Key Question 3C)
- 3.C.5.a Establish protocols for staff cohorting in the event of a norovirus outbreak, where staff care for one patient cohort on their ward (e.g. exposed/symptomatic, exposed/asymptomatic, or unexposed). **(Category IB)** (Key Question 3C)

# Priority Recommendations

- 3.C.9.b Notify appropriate local and state health departments if an outbreak of norovirus is suspected. **(Category IB)** (Key Question 3C)
- 3.C.12.b.1 Increase the frequency of cleaning and disinfection of patient care areas and high-touch surfaces during norovirus outbreaks. Ward level cleaning should be increased up to twice daily, with high-touch surfaces cleaned and disinfected up to three times daily. **(Category IB)**

# Performance Measures

- Evaluate any fluctuations or, optimally, reductions in the incidence of norovirus in healthcare settings may be measured through the National Outbreak Reporting System (NORS).
  - This system monitors the reporting of waterborne, foodborne, enteric person-to-person, and animal contact-associated disease outbreaks to CDC by state and territorial public health agencies.
- Additionally, CDC is currently implementing a national surveillance system for genetic sequences of noroviruses (CaliciNet), which may also be used to measure changes in healthcare-associated norovirus epidemiology

# Areas for Future Research

- Assess the benefit of using the Kaplan criteria as an early detection tool for Norovirus outbreaks in healthcare settings, and to examine whether the Kaplan criteria are more predictive for select strains of Norovirus.
- Correlations between prolonged shedding of Norovirus after symptoms have subsided and the likelihood of secondary transmission of Norovirus infection.
- Identification of an ideal animal model for surrogate testing of Norovirus properties and pathogenesis. Translate laboratory findings into practical infection prevention strategies.

# Areas for Future Research

- Evaluate the contribution of Norovirus-contaminated water sources in healthcare settings.
- Quantify the effectiveness of cleaning and disinfecting agents against Norovirus.
- Effectiveness and reliability of fogging, UV irradiation, and ozone mists to reduce Norovirus environmental contamination.
- The utility of medications that may attenuate the duration and severity of Norovirus illness.

# Areas for Future Research

- Evaluate the effectiveness of FDA-approved hand sanitizers against Norovirus, and the role of non-alcohol based products.
- Develop methods to evaluate Norovirus persistence in the environment with a focus on enduring infectivity.
- The role of asymptomatic shedding (among recovered persons and carriers) in secondary transmission.
- Duration of protective immunity and other protective host factors.

# Improving the Quality of Evidence

- Primary analytic research
  - Use of controls in both clinical and laboratory settings
  - Comparisons between surrogate and human Norovirus strains
  - Consider healthcare-focused risk factors
- Statistically powered studies
- Evaluate clinically relevant outcomes
  - Studies focused on infection control interventions and associated outcomes

# Q3 Summary Table: Prevention Strategies

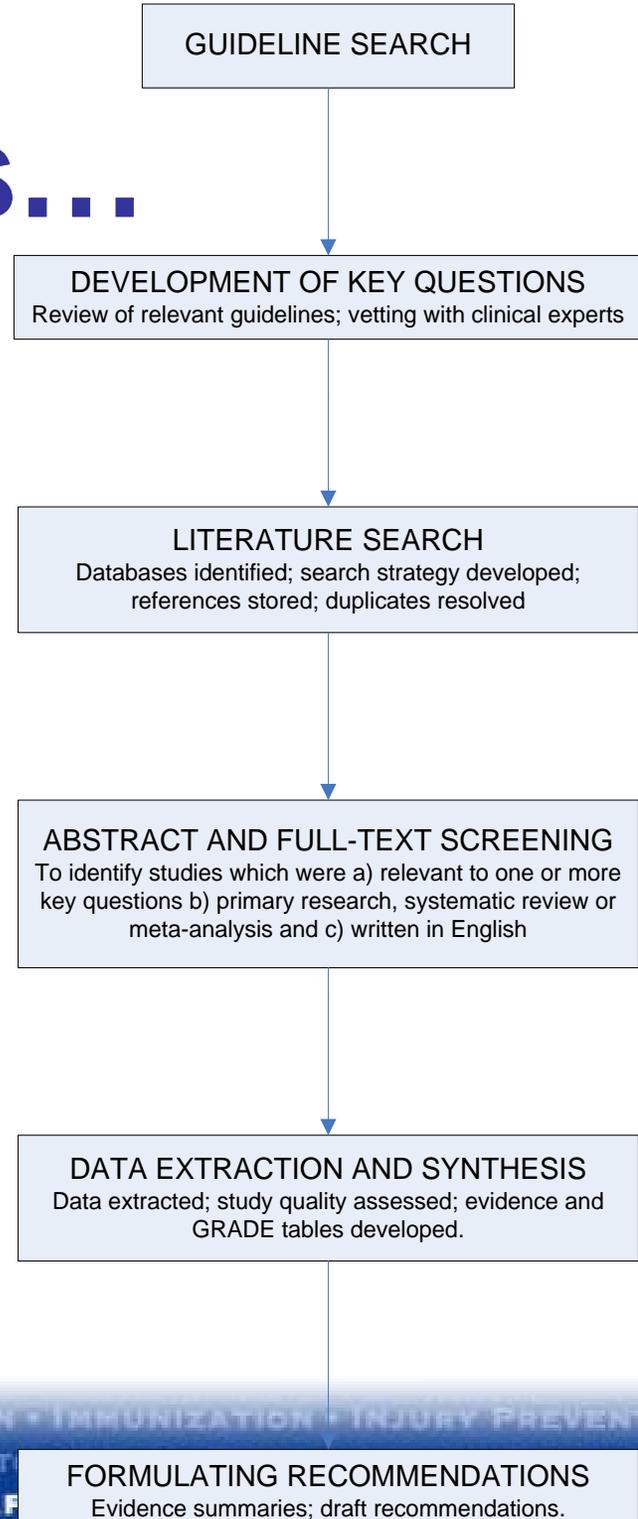
**Table 5. Measures for Prevention and Control of Norovirus Outbreaks in the Published Literature**

Hand Hygiene
<ul style="list-style-type: none"> <li>Wash hands with liquid soap and water (scrub for 15 seconds and rinse with water) and dry with a disposable papertowel</li> <li>Wash hands after going to the bathroom and prior to each meal</li> <li>Implement mandatory hand disinfection with a product containing 95% alcohol in addition to hand washing</li> <li>Make alcohol based handrubs available by every bedside</li> <li>Implement hygiene measures without waiting for virological confirmation</li> <li>Keep fingernails short and scrub with soap and nailbrush while washing hands if work involves handling food</li> </ul>
Protective Apparel
<ul style="list-style-type: none"> <li>Wear gloves, mask and apron for contact with an affected patient or environment</li> <li>Require visitors to use protective apparel for contact with an affected patient</li> </ul>
Isolation/Cohorting of Affected Patients
<ul style="list-style-type: none"> <li>Cohort nurse or isolate symptomatic patients</li> </ul>
Staff Policies
<ul style="list-style-type: none"> <li>Exclude ill staff from work until symptom free for 48 hours</li> <li>Exclude non-essential personnel from an affected ward</li> <li>Prohibit staff working in affected areas from working in unaffected areas for 48 hours</li> </ul>
Ward Policies
<ul style="list-style-type: none"> <li>Close the ward to new admissions or transfers</li> </ul>
Visitor Policies
<ul style="list-style-type: none"> <li>Restrict visitors to 1-2 per patient and prohibit children from visiting</li> <li>Screen visitors for gastroenteritis and prohibit them from visiting if symptomatic</li> </ul>
Disinfection
<ul style="list-style-type: none"> <li>Increase the frequency of routine ward, bathroom or toilet cleaning</li> <li>Disinfect vomitus immediately with hypochlorite solution (5000 ppm)</li> <li>Steam clean carpets</li> <li>Disinfect hard surfaces with 0.1% hypochlorite after cleaning</li> <li>Discard fabrics and furniture that cannot be disinfected</li> <li>Bathroom surfaces and high touch surfaces should be focus of decontamination</li> </ul>
Education of Healthcare Workers
<ul style="list-style-type: none"> <li>Educate healthcare workers (possible topics include clinical symptoms of norovirus, spread of gastroenteritis, cleaning and disinfection procedures, isolation, transfers and discharge)</li> <li>Educate family members of patients</li> </ul>
Surveillance
<ul style="list-style-type: none"> <li>Perform active surveillance and establish a case definition</li> <li>Perform contact tracing among staff if implicated during outbreaks</li> </ul>
Standard Precautions
<ul style="list-style-type: none"> <li>Standard precautions must be followed at all times</li> <li>Contact precautions should be used during outbreaks</li> </ul>

# Final Steps...

- HICPAC Review (Pls comment by 12/3/09)
- Posting on Fed Register
- Final Revisions
- Final HICPAC Vote
- CDC Clearance
- Website Publication

**Timeframe:**  
Winter 2009-2010



# Guidelines for the Prevention of Intravascular Catheter- Related Infections

Lillian A. Burns, MT, MPH  
Infectious Diseases Department  
Infection Control & Prevention  
Greenwich Hospital  
Yale New Haven Health  
Greenwich, CT

# Guidelines for the Prevention of Intravascular Catheter-Related Infections, 2009

Prepared by

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Sanjay Saint, M.D., M.P.H.<sup>13</sup>

# Revisions/ Additions

## Education, training and staffing

### Recommendation:

Ensure appropriate nursing staff levels in ICUs to minimize the incidence of catheter-related BSIs.

**observational studies suggest a ratio of 2:1 in ICUs where nurses managing patients with CVCs [75-77]. Category IB**

*changed from 1A*

## Site selection

### Recommendations for peripheral catheters and midline catheters

- In pediatric patients, **the upper or lower extremities or the scalp can be used** as the catheter insertion site.  
(old language hand or dorsum of foot)
- Use a midline catheter or peripherally inserted central catheter (PICC), **instead of a short peripheral catheter**, when the duration of IV therapy will likely exceed six days . Category IB

# Maximal Sterile Barrier Precautions

## Recommendation:

Use maximal sterile barrier precautions, including the use of a cap, mask, sterile gown, sterile gloves, and a large sterile **full body drape**, for the insertion of CVCs, PICCs guidewire exchange, Category IB

*changed from category 1A*

## Skin Preparation

Prepare clean skin site with a 2% chlorhexidine-based preparation before central venous, catheter insertion and during dressing changes. If there is a contraindication to chlorhexidine, a tincture, an iodophor, or 70% alcohol can be used as alternatives. Category IA

Old language ‘disinfect skin with appropriate antiseptic, although 2% chlorhexidine is preferred’, a tincture of.. .

## Skin Preparation

Allow povidone iodine to remain on the skin for at least 2 minutes or longer for the antibacterial properties to take effect, if it is not yet dry before catheter insertion. **The antibacterial properties of chlorhexidine work on contact, and chlorhexidine does not require a minimum 2-minute drying time before proceeding. Catheter insertion may begin as soon as the chlorhexidine is dry** Category .IB

## Catheter site dressing regimens

- If the patient is diaphoretic or if the site is bleeding or oozing, use gauze dressing **(removed)** *which is preferable to a transparent or semi-permeable dressing* until this is resolved.  
Category II
- Do not use topical antibiotic ointment or creams on insertion sites, except for dialysis catheters, because of their potential to promote fungal infections and antimicrobial resistance.

Category IB *changed from 1A*

## Catheter site dressing regimens

Use a chlorhexidine-impregnated sponge dressing for temporary short-term catheters in patients older than 2 months of age, if the CRBSI rate is higher than the institutional goal, despite adherence to basic CRBSI prevention measures, including education and training, use of chlorhexidine for skin antisepsis, and MSB .  
Category 1B

Old language, **“No recommendation can be made....”**

# Patient Cleansing

## Recommendation

Use a 2% chlorhexidine wash daily to reduce CRBSI Category II (new addition)

# Catheter Securement Devices

## Recommendation:

Use a suture less securement device to reduce the risk of infection for PICCs.

Category II

Old language, “no recommendation can be made”

# Antimicrobial/Antiseptic Impregnated Catheters and Cuffs

## Recommendation:

### **Use a chlorhexidine/silver sulfadiazine or minocycline/rifampin -impregnated CVC**

in adults whose catheter is expected to remain in place >5 days if, after successful implementation of a comprehensive strategy to reduce rates of CRBSI, the CRBSI rate remains above the goal set by the individual institution based on benchmark rates (Tables 2 and 3) and local factors. The comprehensive strategy should include at least the following three components: educating persons who insert and maintain catheters, use of maximal sterile barrier precautions, and a 2% chlorhexidine preparation for skin antisepsis during CVC insertion. Category IA

**Changed from 1B**

# Antibiotic Lock Prophylaxis, Antimicrobial Catheter Flush and Catheter Lock Prophylaxis

## Recommendation:

Use prophylactic antimicrobial lock solution **in patients with long term catheters** who have a history of multiple CRBSI despite optimal maximal adherence to aseptic technique.

Category II

## **Antibiotic/Antiseptic Ointments**

### **Recommendation:**

Use povidone iodine antiseptic ointment or bacitracin/neomycin/polymyxin B ointment at the hemodialysis catheter exit site after catheter insertion and at the end of each dialysis session only if this ointment does not interact with the material of the hemodialysis catheter per manufacturer's recommendation. Category IB

**Changed from category II**

# Anticoagulants

## Recommendation:

Do not routinely use anticoagulant therapy to reduce the risk of catheter-related infection in general patient populations.  
Category II

new addition

# Replacement of Peripheral and Midline Catheters

## Recommendation:

Replace peripheral catheters in children only when clinically indicated. Category 1B

Old language, “Leave PVC in place in children until IV therapy is completed unless complications occur”

# Replacement of Peripheral and Midline Catheters

Replace midline catheters only when there is a specific indication. Category II

Old language, “Do not routinely replace midline catheters...”

**Changed from Category 1B**

# Replacement of CVCs, Including PICCs and Hemodialysis Catheters

## Recommendation:

Do not use guidewire exchanges routinely for non-tunneled catheters to prevent infection.

Category IB

New addition

# Peripheral Arterial Catheters and Pressure Monitoring Devices for Adult and Pediatric Patients Recommendations

- 1. In adults, use of the radial, brachial or dorsalis pedis sites is preferred over the femoral or axillary sites of insertion to reduce the risk of infection. Category IB **NEW**
- 2. In children, the brachial site should not be used. The radial, dorsalis pedis, and posterior tibial sites are preferred over the femoral or axillary sites of insertion . Category II **(New)**
- 3. A cap, mask, sterile gloves and a large sterile fenestrated drape should be used during peripheral arterial catheter insertion [95, 293]. Category IB
- 4. During axillary or femoral artery catheter insertion, maximal sterile barriers precautions should be used. Category II **(New)**

# Peripheral Arterial Catheters and Pressure Monitoring Devices for Adult and Pediatric Patients

Replace arterial catheters only when there is a clinical indication. Category II

Old Language, “Do not routinely replace peripheral arterial catheter”

Use disposable, **rather than reusable**, (New) transducer assemblies when possible.

Category IB

# Replacement of Administration Sets

## Recommendation:

In patients not receiving blood, blood products or lipid emulsions, replace administration sets, including secondary sets and add-on devices, no more frequently than at 96-hour intervals, but at least every 7 days. Category IA

Old language, “ at 72 hr intervals, unless catheter related infection suspected

## Replacement of Administration Sets

Replace tubing used to administer propofol infusions every 6 or 12 hours, **when the vial is changed**, (New) per the manufacturer's recommendation (FDA website Medwatch)

Category IA

# Needleless Intravascular Catheter Systems

## Recommendations

- Change the needleless components at least as frequently as the administration set. **There is no benefit to changing these more frequently than every 72 hours. (New) Category II**
- Change caps no more frequently than every 72 hours **for the purpose of reduced infection rates ( New) or according to manufacturers' recommendations.**

Category II

# Needleless Intravascular Catheter Systems

- Minimize contamination risk by wiping the access port with an appropriate antiseptic (**chlorhexidine preferred**) **(New)** Category IA Changed from 1B
- Use a needleless system to access IV tubing. Category IC (New)
- When needleless systems are used, the split septum valve is preferred over the mechanical valve due to increased risk of infection . Category II (New)

# Multidose Parenteral Medication Vials and Parenteral Fluids

## Recommendations:

- All multidose vials should be dated when 1st used and thereafter not used beyond the manufacturer's stated expiration period.  
Category IC (New)
- Use the needle and syringe to access the multidose vial only once and to then discard both safely. This applies to each and every dose withdrawn from the vial. Category IA (New)

# Performance Improvement

## Recommendation:

Use hospital-specific or collaborative-based performance improvement initiatives in which multifaceted strategies are "bundled" together improve compliance with evidence-based recommended practices. Category 1B (New)

# Removed from 2009 Guidelines

## II. Surveillance

A. Monitor the catheter sites visually or by palpation through the intact dressing on a regular basis, depending on the clinical situation of individual patients. If patients have tenderness at the insertion site, fever without obvious source, or other manifestations suggesting local or BSI, the dressing should be removed to allow thorough examination of the site (1, 191--193). **Category IB**

B. Encourage patients to report to their health-care provider any changes in their catheter site or any new discomfort. **Category II**

C. Record the operator, date, and time of catheter insertion and removal, and dressing changes on a standardized form. **Category II**

D. Do not routinely culture catheter tips (8, 194, 195). **Category IA**

# Removed from 2009 Guidelines

## V. Catheter insertion

- Do not routinely use arterial or venous cutdown procedures as a method to insert catheters (204--206). **Category IA**

## VI. Catheter site care

- Do not apply organic solvents (e.g., acetone and ether) to the skin before insertion of catheters or during dressing changes (209). **Category IA**

## VII. Catheter-site dressing regimens

- Change dressings at least weekly for adult and adolescent patients depending on the circumstances of the individual patient (211). **Category II**

# Removed from 2009 Guidelines

## Selection and replacement of intravascular catheters

- A. Select the catheter, insertion technique, and insertion site with the lowest risk for complications (infectious and noninfectious) for the anticipated type and duration of IV therapy (22,55,59, 216--218).

### **Category IA**

- E. When adherence to aseptic technique cannot be ensured (i.e., when catheters are inserted during a medical emergency), replace all catheters as soon as possible and after no longer than 48 hours (22,71,201,202). **Category I**
- F. Use clinical judgment to determine when to replace a catheter that could be a source of infection (e.g., do not routinely replace catheters in patients whose only indication of infection is fever). Do not routinely replace venous catheters in patients who are bacteremic or fungemic if the source of infection is unlikely to be the catheter (224). **Category II**

# Removed from 2009 Guidelines

## Peripheral Venous Catheters, Including Midline Catheters, in Adult and Pediatric Patients

### Replacement of catheter

- Evaluate the catheter insertion site daily, by palpation through the dressing to discern tenderness and by inspection if a transparent dressing is in use. Gauze and opaque dressings should not be removed if the patient has no clinical signs infection. If the patient has local tenderness or other signs of possible CRBSI, an opaque dressing should be removed and the site inspected visually.

### Category II

- Remove peripheral venous catheters if the patient develops signs of phlebitis (e.g., warmth, tenderness, erythema, and palpable venous cord), infection, or a malfunctioning catheter (66). **Category IB**

# Removed from 2009 Guidelines

## Catheter and catheter-site care

- Do not routinely apply prophylactic topical antimicrobial or antiseptic ointment or cream to the insertion site of peripheral venous catheters (*107,213*). **Category IA**

# Removed from 2009 Guidelines

- Conduct surveillance in ICUs and other patient populations to determine CRBSI rates, monitor trends in those rates, and assist in identifying lapses in infection-control practices (3, 12, 16, 247--[250](#)). **Category IA**
- Express ICU data as the number of catheter-associated BSIs per 1,000 catheter-days for both adults and children and stratify by birth weight categories for neonatal ICUs to facilitate comparisons with national data in comparable patient populations and health-care settings (3, 12, 16, 247--[250](#)). **Category IB**
- Investigate events leading to unexpected life-threatening or fatal outcomes. This includes any process variation for which a recurrence would likely present an adverse outcome (13). **Category IC**

# Removed from 2009 Guidelines

## General principles

- No recommendation can be made for the use of impregnated catheters in children. **Unresolved issue**
- Use totally implantable access devices for patients who require long-term, intermittent vascular access. For patients requiring frequent or continuous access, a PICC or tunneled CVC is preferable (256,257). **Category II**
- Use a cuffed CVC for dialysis if the period of temporary access is anticipated to be prolonged (e.g., >3 weeks) (144,258). **Category IB**
- Use a fistula or graft instead of a CVC for permanent access for dialysis (142). **Category IB**

# 2009 Evidence Categories

- **Category IA.** Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.
- **Category IB.** Strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies, and a strong theoretical rationale.
- **Category IC.** Required by state or federal regulations, rules, or standards.
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- **Unresolved issue.** Represents an unresolved issue for which evidence is insufficient

# 2002 Evidence Categories

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**Unresolved issue.** Represents an unresolved issue for which evidence is insufficient or no consensus regarding efficacy exists

- Questions?

# Pediatric Guideline Update

Alexis Elward M.D., M.P.H.

HICPAC

November 13, 2009

# Pediatric Infection Prevention: Gap Summary

- Denominators
- Attributable Mortality
- Preventability of CLABSI in select pediatric subpopulations
- Benchmarks for pediatric SSI
- Risk stratification for pediatric SSI
- MRSA colonization (NICU)
- Family and patient education
- Viral infections (NICU)

# Stakeholder Feedback

- Society for Healthcare Epidemiology of America (SHEA) Pediatric Special Interest Group (PSIG)
  - Recommendation: Research Gap Analysis v. NICU guideline
- Children's Hospitals Neonatal Consortium
- Society for Pediatric Research 2009 symposium on NICU Infection Prevention
- American Academy of Pediatrics
  - NICU Infection Prevention guideline under discussion

# NICU Infection Prevention: Search Results

Topic	N of studies	N of interventions
CLABSI	46	4
MRSA	60	13
Candida	79	10

Only topic with randomized controlled trials is Candida

# Key Questions: NICU Viral Infections

- What are the most effective ways to prevent respiratory viral infections in NICU patients?
- What is the best method for detection of an outbreak of respiratory viral pathogens in the NICU?
- What are the best methods for control of respiratory viral pathogens in the NICU?
  - Primary prevention
    - Visitation policies
  - Secondary prevention
    - Utility of empiric isolation precautions for exposed asymptomatic NICU patients
    - Criteria for removal of empiric isolation precautions
    - Synagis prophylaxis for NICU pts exposed to RSV

# Key Questions: NICU CLABSI

- What are the best strategies to prevent CLABSI in NICU patients?
  - Safety and efficacy of chlorhexidine in infants < age 2 months
  - Impact of silver coated catheters on CLABSI rates
  - Efficacy of closed flush medication systems
  - Efficacy of two person tubing changes using sterile garb

# Key Questions: NICU MRSA

- What are the patient and environmental characteristics associated with MRSA colonization in NICU patients?
- What are the most effective surveillance strategies?
- What are the most effective control measures?
  - Should parents follow isolation precautions?
  - Multiples (Twins/Triplets) with discordant MRSA colonization status
  - Mother colonized with resistant organism

# Key Questions: Invasive Candidal Infections

- What are the patient characteristics associated with invasive Candidal infections?
- What are the most effective prevention strategies?

# Next Steps

Task	Deliverable	Timeline
Define stakeholders	List of professional societies representing NICU and Pediatric Infection Prevention	Dec 1
Formal Survey of stakeholders re: priority areas and research gaps	Develop and administer survey	Feb 1
Assemble writing group	Monthly conference calls Writing/Lit review assignments	Dec 1
Review existing HICPAC guidelines to reference topics	Summary of existing guidelines and relevant recommendations	?Mar 1
Comprehensive literature review	List of articles relevant to NICU Infection Prevention	? Feb 1

# HICPAC Discussion Items

- Guidance v. Gap Analysis
- Paucity of randomized controlled trials upon which to base Level Ia recommendations
  - Level Ib or Level II recommendations
  - Survey experts v. inclusion in writing and review
  - Survey mechanisms
    - Professional societies
    - Emerging Infections Network