# Division of Healthcare Quality Promotion
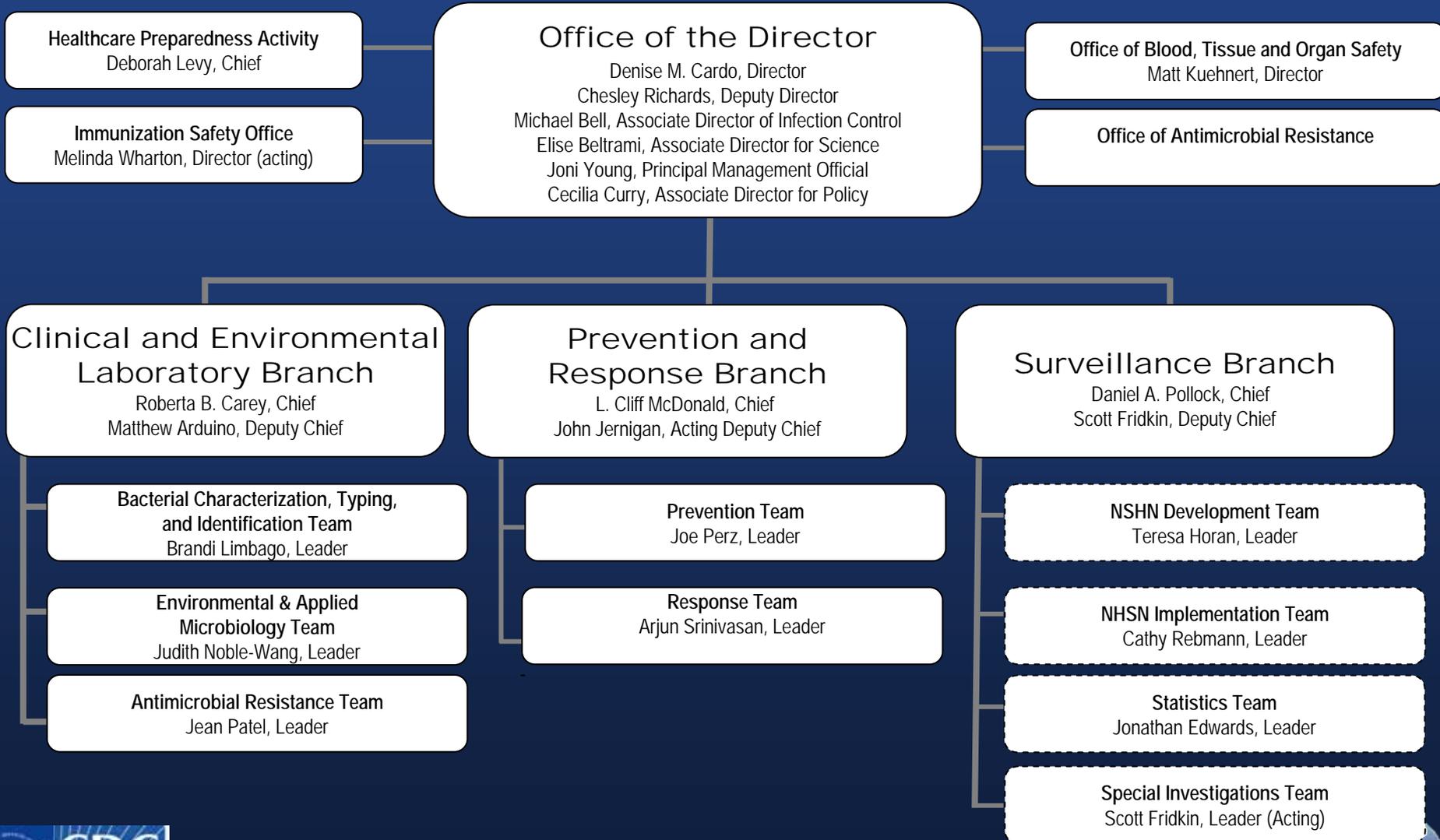
## HICPAC Meeting
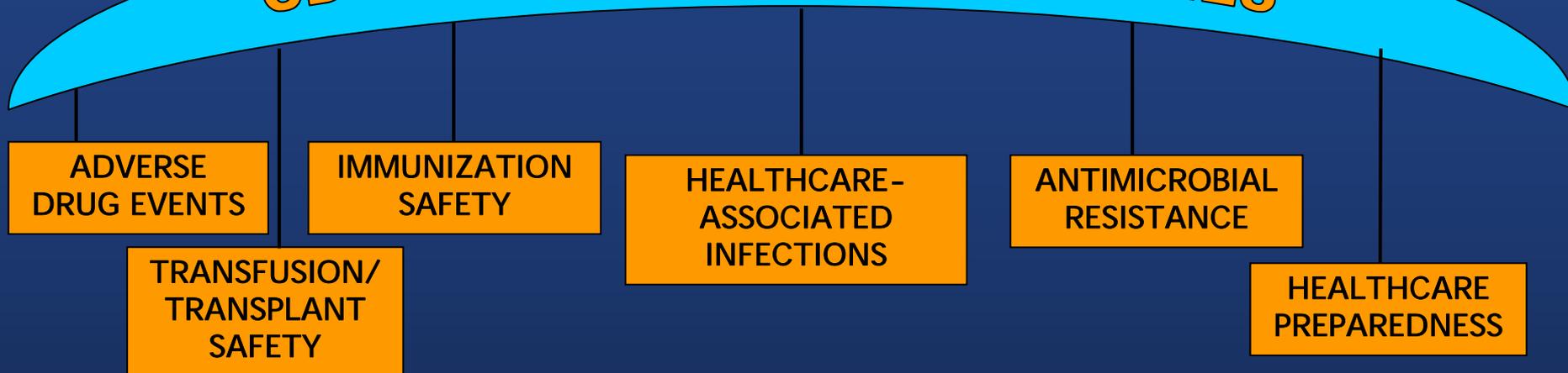
November 13, 2008

# Division of Healthcare Quality Promotion *(proposed)*

**Healthcare Preparedness Activity**
Deborah Levy, Chief

**Immunization Safety Office**
Melinda Wharton, Director (acting)

**Office of the Director**
Denise M. Cardo, Director
Chesley Richards, Deputy Director
Michael Bell, Associate Director of Infection Control
Elise Beltrami, Associate Director for Science
Joni Young, Principal Management Official
Cecilia Curry, Associate Director for Policy

**Office of Blood, Tissue and Organ Safety**
Matt Kuehnert, Director

**Office of Antimicrobial Resistance**

## Clinical and Environmental Laboratory Branch
Roberta B. Carey, Chief
Matthew Arduino, Deputy Chief

**Bacterial Characterization, Typing, and Identification Team**
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**Environmental & Applied Microbiology Team**
Judith Noble-Wang, Leader

**Antimicrobial Resistance Team**
Jean Patel, Leader

## Prevention and Response Branch
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**Prevention Team**
Joe Perz, Leader

**Response Team**
Arjun Srinivasan, Leader

## Surveillance Branch
Daniel A. Pollock, Chief
Scott Fridkin, Deputy Chief

**NSHN Development Team**
Teresa Horan, Leader

**NHSN Implementation Team**
Cathy Rebmann, Leader

**Statistics Team**
Jonathan Edwards, Leader

**Special Investigations Team**
Scott Fridkin, Leader (Acting)

# CDC PATIENT SAFETY ACTIVITIES

**ADVERSE DRUG EVENTS**

**IMMUNIZATION SAFETY**

**HEALTHCARE-ASSOCIATED INFECTIONS**

**ANTIMICROBIAL RESISTANCE**

**TRANSFUSION/ TRANSPLANT SAFETY**

**HEALTHCARE PREPAREDNESS**

*Working through . . .*

- Outbreak Investigations
- Surveillance
- Prevention Recommendations

- Intervention Implementation
- Laboratory Research
- Collaborations and Partnerships

# Highlights

- Outbreak investigations
- Prevention (extramural) research
- Surveillance activities
- Successes

# DHQP Recent Outbreak Investigations

- 35 Epi-Aids in 2007-2008

- Hospital infections caused by emerging pathogens or pathogens with emerging resistance

- Infections transmitted by tissue and organ transplants

- Related to ambulatory procedures

- Related to compounded medical products

- Related to intrinsic contamination of healthcare items
  - Examples: pre-filled heparin and saline syringes contaminated with *Serratia marcences,* heparin associated with anaphylactic reactions, *a*lcohol-free mouthwash (*Burkholderia vanimaris)*

➢ National impact, leading to voluntary or FDA-recalls and changes in national recommendations

# Investigation of Anaphylactoid Reactions Among Dialysis Patients

- Investigation at one dialysis clinic in MO showed an association with the receipt of heparin.

- Was the start of the large, national investigation that led to the identification and recall of heparin contaminated with over-sulfated chondroitin sulfate.

# Outbreaks of KPC Producing Organisms

- DHQP has gotten several calls to help with these and recently completed a field investigation of a large outbreak of KPC producing organisms in Puerto Rico.

- These outbreaks suggest that this might be the ideal time to intervene to try and halt the spread of these pathogens!

# Healthcare-associated Outbreak Investigations

**Nevada Epi-Aid investigation: hepatitis C outbreak**

- Discovered reuse of syringes and single dose vials

- Resulted in massive patient notification: risks of bloodborne viral infections due to unsafe injection practices



NEW VIAL

CLEAN NEEDLE

CLEAN SYRINGE

HCV

HCV INFECTED PATIENT

SAME SYRINGE

NEW NEEDLE

DIRTY NEEDLE

SAME VIAL (NOW TAINTED)

NEW NEEDLE

CLEAN SYRINGE

NCPDCID
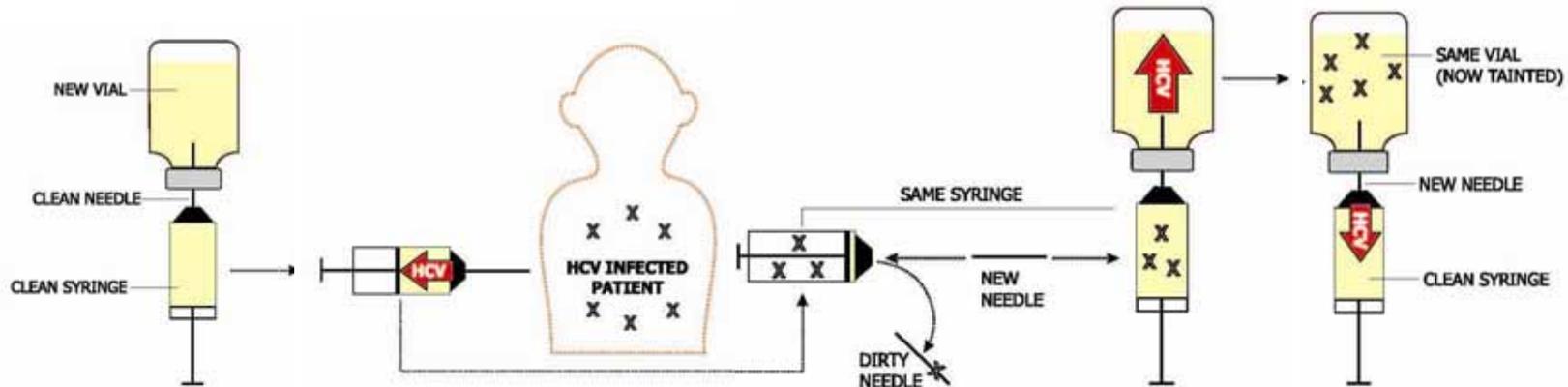
# Protecting Patients in Outpatient Settings

Inspections: pilot assessments of infection prevention practices

ASC inspections using CDC infection control assessment tool

| State | # facilities |
|---|---|
| Nevada | 49 |
| OK | 20 |
| MD | 32 |
| NC | 16 |
| Total: | 117 |

Outcome: Identified a myriad of deficiencies in basic safe care identified (e.g., widespread reuse of single-use medications)

Need: large scale-up effort to institutionalize safe care practices into education, accreditation and inspection requirements



NCPDCID

# Clinical Microbiological Laboratory

- **National Reference Laboratory**
  - Staphylococci
  - Anaerobic bacteria
  - Enteric gram negative rods
  - Antimicrobial susceptibility testing

- **Laboratory support for the epidemiologic investigations of outbreaks**
  - 41 outbreaks, over 1900 specimens processed by DHQP laboratories in FY 08

# Funded Prevention of Healthcare-associated Infections and MRSA

- Prevention Epicenters

  - Innovation for detection and prevention of healthcare-associated infections (HAIs), MRSA, *Clostridium difficile* infections (CDI)

  - Expansion to the VA to assess HAI prevention interventions

- MRSA prevention activities
  - AHRQ collaboration to prevent MRSA

  - Potential Extramural Projects (PEP)

- Stakeholder meetings
  - National targets for HAIs
  - 2 Stakeholder meetings (MRSA decolonization and MRSA reporting)

# Funded Prevention Epicenters/VA Collaboration

- **Evaluating the use of electronic data sources to:**
  - Detect central-line associated bloodstream infections
  - Detect MRSA outbreaks
  - Evaluate impact of MRSA prevention programs by using clinical microbiology information to create incidence measures
  - Demonstrate impact of current VA MRSA prevention activities using data from Veteran's Integrated Service Network (VISN).

- **Evaluating additional ways to detect HAIs**
  - Surrogate inpatient surveillance measures for surgical site infections (SSI)
  - Medicare claims to identify hospitals with high SSI rates
  - ICD9 codes for ascertaining device-days of use and related adverse events
  - Surveillance methods for *Clostridium difficile* infection
  - Measuring variability and appropriateness of antimicrobial utilization

# Funded Prevention Epicenters/VA Collaboration

Developing interventions, evaluating effectiveness of interventions

- MRSA prevention:
  - cleansing of patients with chlorhexidine cloths
  - reduce transmission of MRSA and VRE
    - Electronic alerts to flag high risk patients
    - Collection of nasal swab (PCR)
    - Toyota Production System-based quality improvement program
  - large VA multi-site study
    - Evaluate effectiveness of screening and decolonization for MRSA control
  - automated standing orders for routine ICU MRSA surveillance cultures
    - Impact on ICU and total hospital MRSA bacteremia

- Urinary Track Infections prevention:
  - Implementing an intervention to electronically identify and flag patients for whom urinary catheters may no longer be needed

- Evaluating impact of *Clostridium difficile* infections (CDI) prevention strategies

# Funded MRSA Prevention

- <u>Partnering with the Agency for Healthcare Research and Quality (AHRQ)</u>
  - Assess prevention in a healthcare system
    - Acute care hospitals and long-term facilities
    - Healthcare and community-associated infections

- <u>Potential Extramural projects (PEP):</u>
  - Evaluating surrogates for adherence to infection control practices
    - Monitoring adherence with isolation precautions in 5 affiliated hospitals
    - Using radio-frequency-identification (RFID) to monitor hand hygiene compliance among a hospital's employees

- <u>Delmarva Foundation</u>
  - Assessing the impact of Positive Deviance Model to reduce MRSA colonization and infection

# Pilot MRSA Projects

- State surveys on MRSA prevention recommendations
- Evaluation of administrative data to detect MRSA
- Evaluation of impact of MRSA State legislation (IL)

**Unit**

ICU
VA Pittsburgh

**Facility**

Hospital-wide

VA Pittsburgh

**Region**

VA Pilot

• 17 hospitals, multiple states

Maryland Initiative

• 15 hospitals

RWJ Initiative

• 6 hospitals, 4 states

**National**

National VA Initiative

• 150 hospitals

• nationwide

CMS

•9th Scope of Work

National

>60% Reduction in MRSA

Local
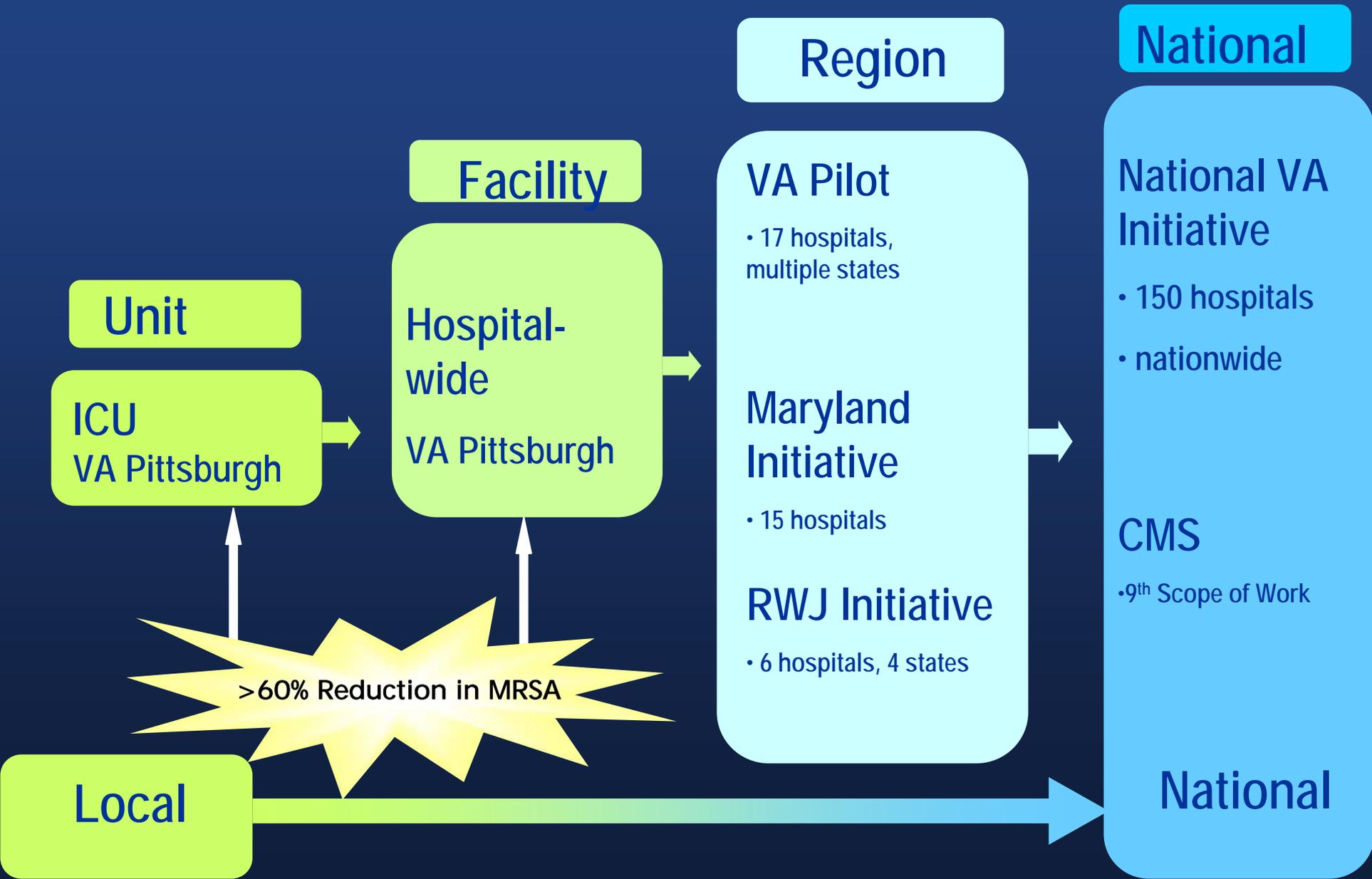
# Surveillance Projects

- Population-based surveillance of MRSA and CDI (EIPs)
- NHSN expansion and enhancement
  - Enrollment, training and validation
  - Operating system enhancements and maintenance
  - Improved analysis and reporting of outcomes and process of care data
  - MDRO module
  - Integration of NHSN data with other HHS Agencies

- NHSN electronic data capture

# Current DHQP/CDC Activities to Enhance Use of Electronic Data Sources

*eSurveillance Projects*
- Clinical Document Architecture (CDA)
- Health Level 7 messaging
- HAI detection

HL7 V3 CDAR2 HAIRPT, R2

HL7 Implementation Guide for CDA Release 2:
NHSN Healthcare Associated Infection (HAI)
Reports, Release 2

Draft Standard for Trial Use Ballot

September 2008

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# Number of hospitals using National Healthcare System Network (NHSN) has QUADRUPLED in the last year

## April 2007

- 491 facilities enrolled
  - 44% had 201–500 beds

- 8 States using or planning to use NHSN for mandatory reporting

## October 2008

- 1930 facilities enrolled (47 States)
  - 33% have 201–500 beds (58% have $\leq$ 200 beds)

- 19 States using or planning to use NHSN for mandatory reporting

# 19 States Using NHSN for Public Reporting*

MD OK VA      OR

NY VT  SC CO TN CT  PA  CA DE MA WA   IL  NJ  WV

→

**Jan 2007**          **Jan 2008**                    **Jan 2009**

| CLABSI | CO, CT, DE, IL, MA, MD, NJ, NY, OK, OR, PA, SC, TN, VA, VT, WA |
|---|---|
| CAUTI | PA |
| SSI | CO, DE, MA, NJ, NY, OR, PA, SC, TN, VT |
| VAP | OK, PA, SC, WA |
| Dialysis events | PA |
| MDRO* | CA, MD, NJ, PA |
| Process measures | CA, DE, MD, NJ, PA, VT |

# Hospitals Participating in NHSN are Preventing Bloodstream Infections

Trends in Bloodstream Infections* by ICU Type, United States, 1997–2007

Legend:
- **Medical**
- **Medical/Surgical--Major Teaching**
- **Medical/Surgical--Non-Major Teaching**
- **Pediatric**
- **Surgical**

*Central line–associated bloodstream infections
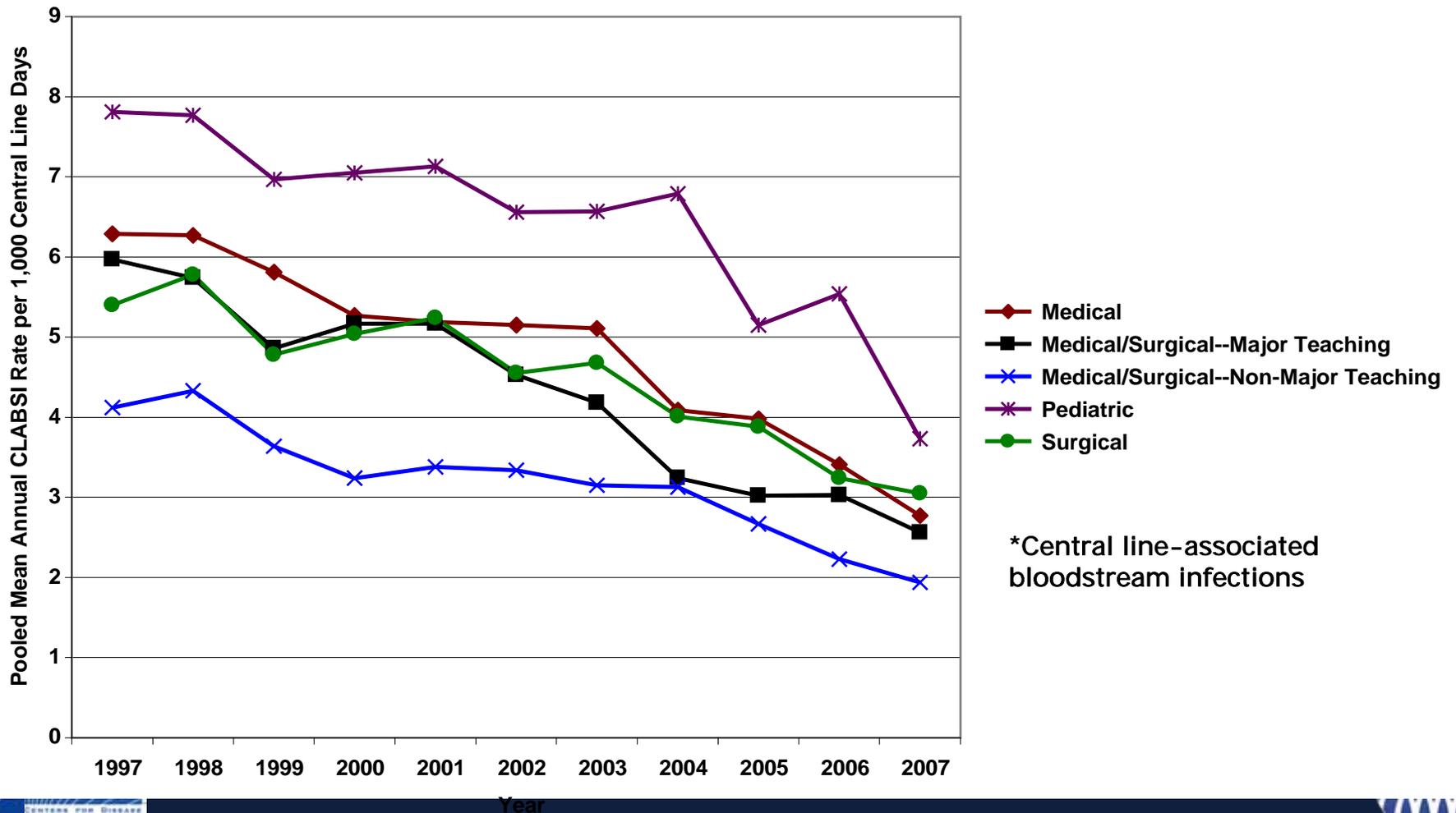
Figure. Trends in %MRSA and Incidences of MRSA and MSSA Central Line-Associated Bloodstream Infections (CLABSIs) in Intensive Care Units--United States, 1997-2007*
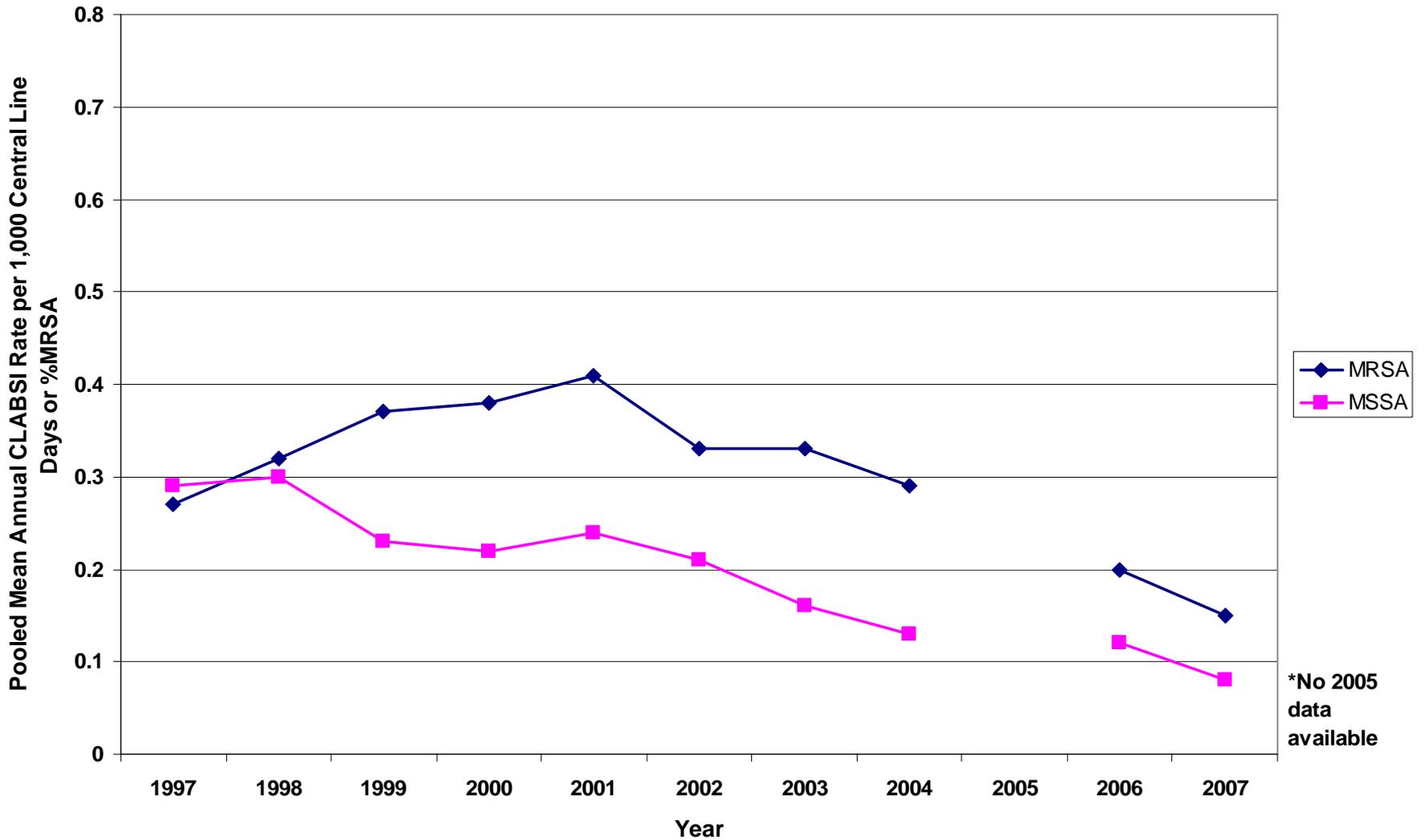
*No 2005 data available

# Population-based Surveillance of MRSA
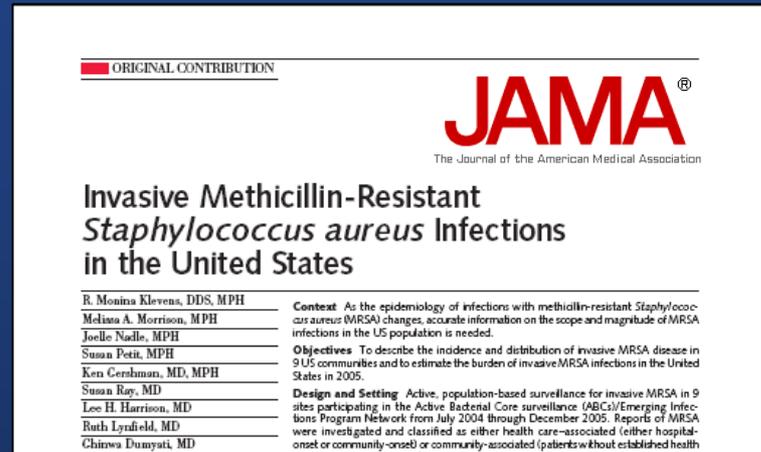


~ Invasive MRSA infections alone are responsible for approximately **94,000 infections and 19,000 deaths each year**.

Approximately **85%** of these serious MRSA infections are healthcare associated.

    -Hospital-onset (approximately 16% decrease; 20% for bacteremia)*

    -Community –onset (approximately 9% decrease)*

        *2005-07 preliminary analysis

National Health and Nutrition Examination Survey
Percentage of individuals colonized with
*S. aureus* and MRSA
No. of participants: 9622 in 01-02 and 9004 in 03-04
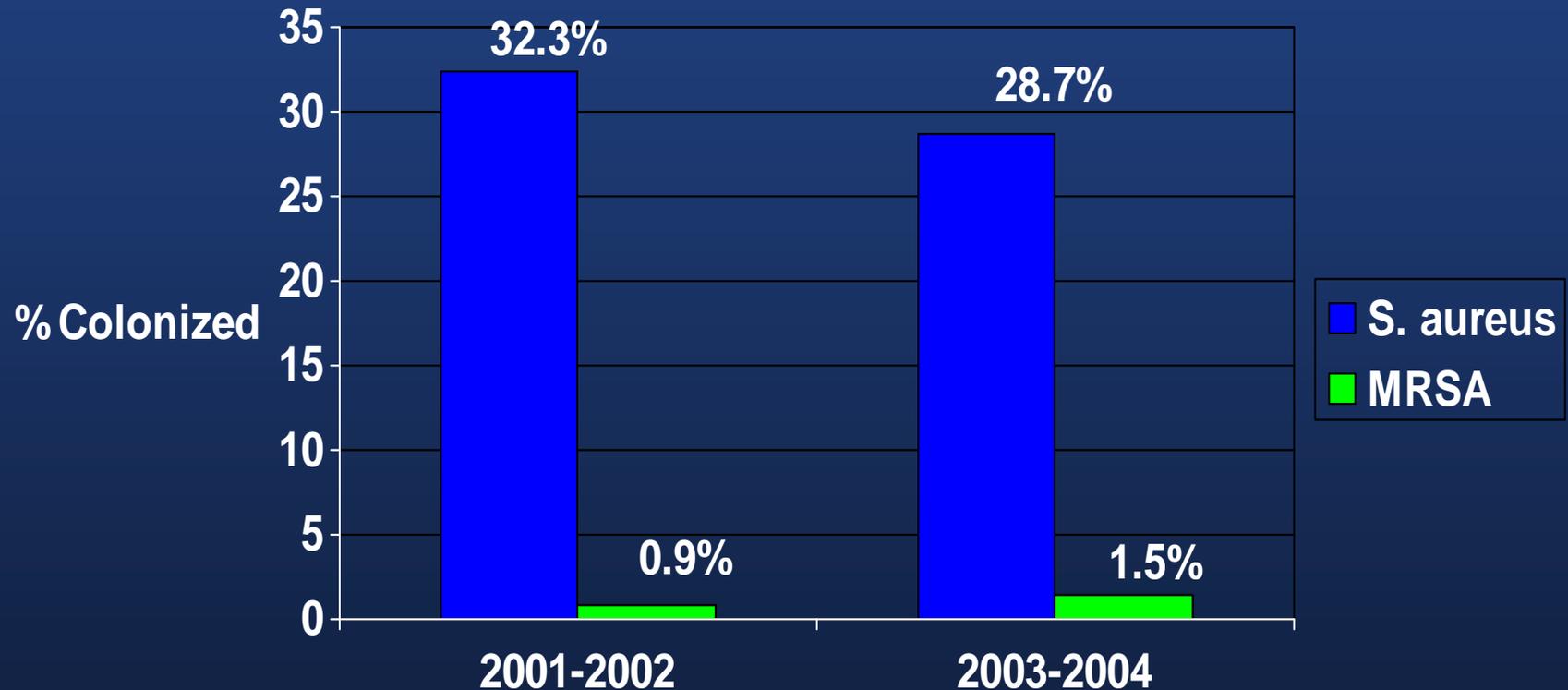
Kuehnert MJ et al. J Infect Dis 2006 192:172-9
Gorwitz RJ et al.

# MRSA Was the Most Commonly Identified Cause of Purulent SSTIs Among Adult ED Patients (*EMERGE*ncy ID Net)



54%

39%

15%

59%
(97% USA300)

55%

74%

51%

68%

60%

72%

60%

67%

Moran et al NEJM 2006

# National Estimates of US Short-Stay Hospital Discharges with *C. difficile* as First-Listed or Any Diagnosis, National Inpatient Sample

Elixhauser, A. (AHRQ), and Jhung, MA. (Centers for Disease Control and Prevention). *Clostridium Difficile-Associated Disease in U.S. Hospitals, 1993–2005*. HCUP Statistical Brief #50. April 2008. Agency for Healthcare Research and Quality, Rockville, MD. And unpublished data http://www.hcup-us.ahrq.gov/reports/statbriefs/sb50.pdf
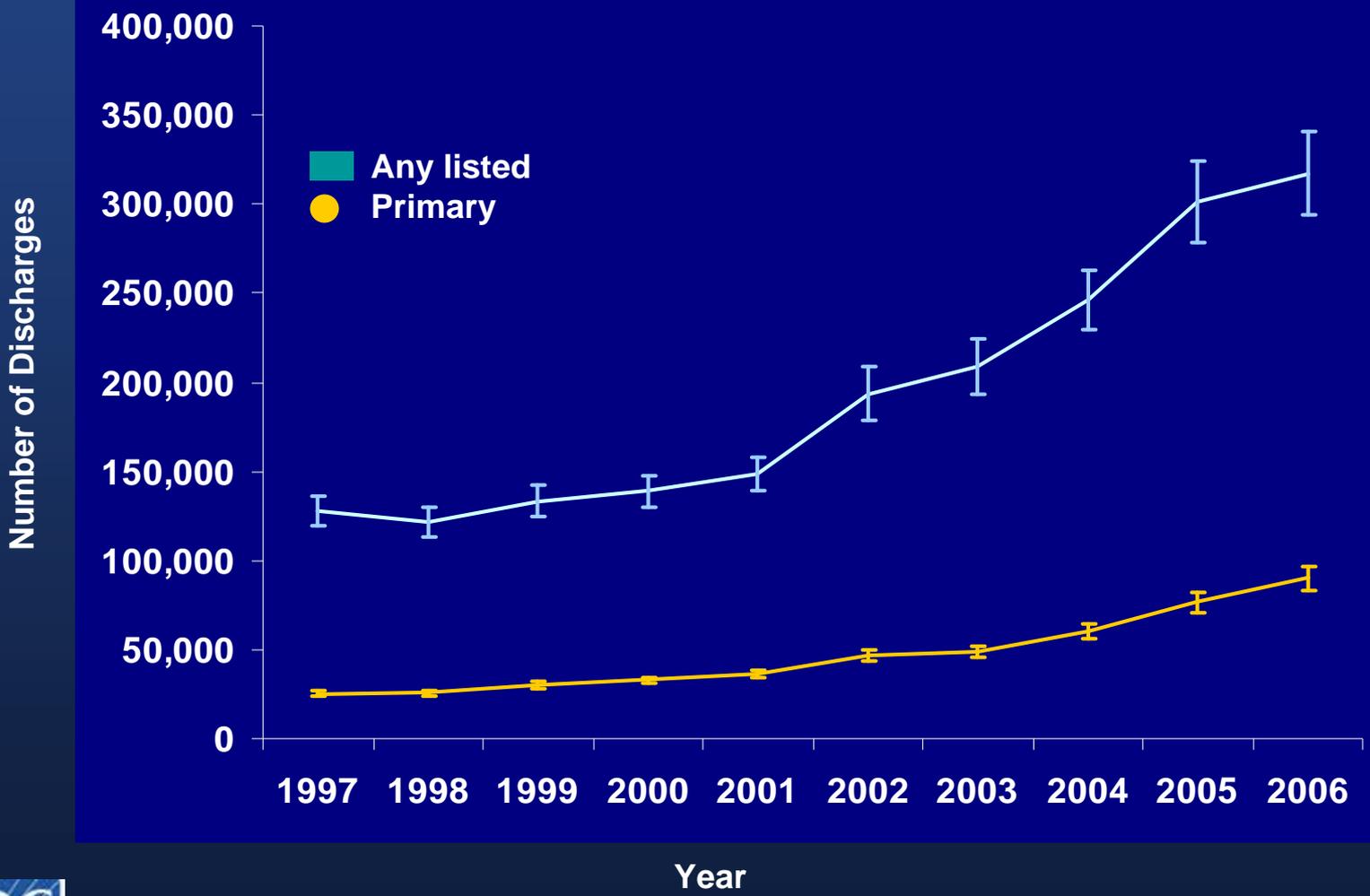
# States with BI/NAP1/027 strain of *C. difficile* (N=40), October, 2008
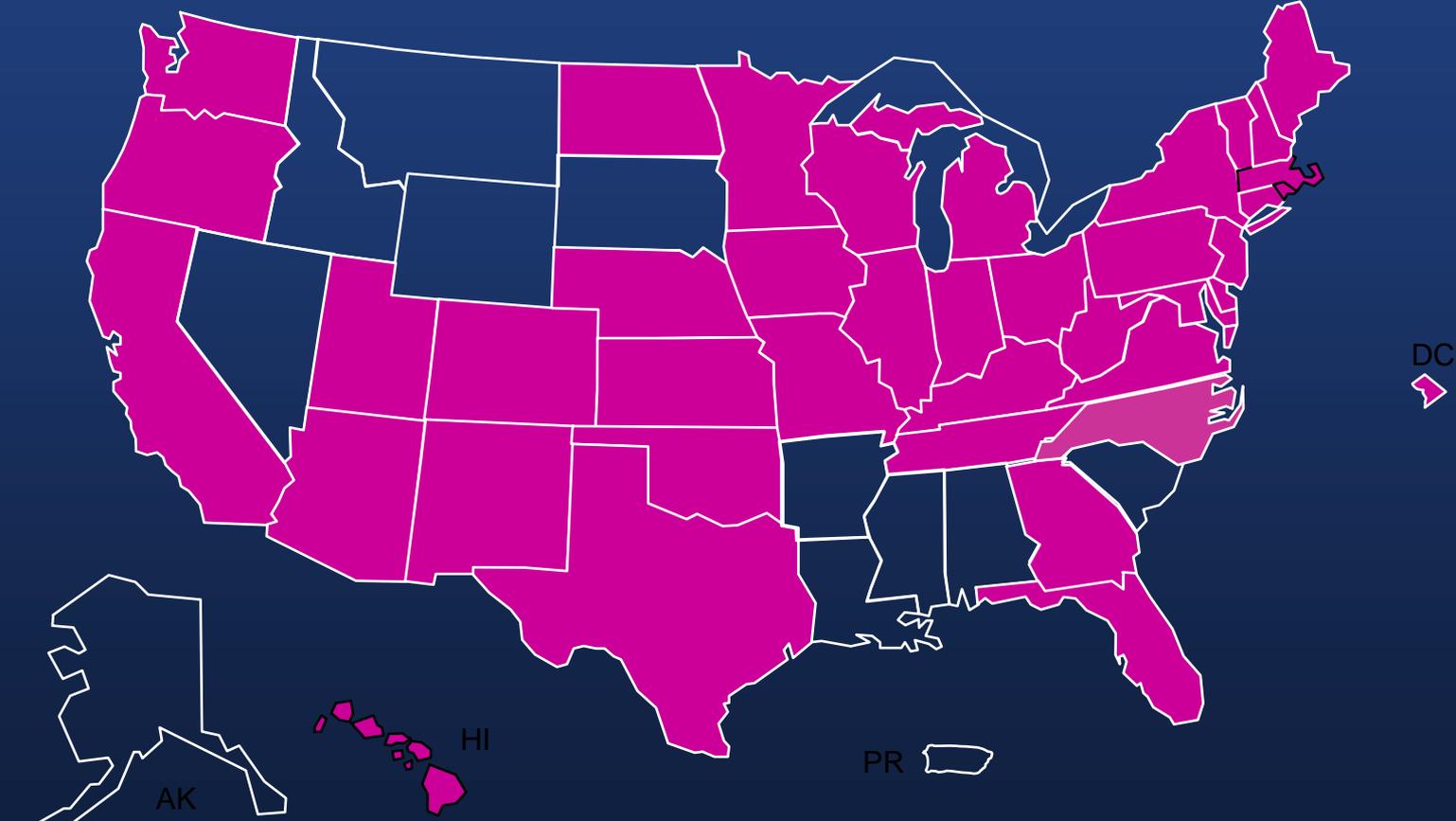
# Public Reporting in Ohio, 2006
## N=14,100 cases

- Hospital onset
  - 5,000 initial cases; 7–8/10,000 pt-days
  - ~1,200 recurrent cases; 1–2/10,000 pt-days
- Long-term care facility onset
  - ~4,800 initial cases; 2–3/10,000 pt-days
  - ~3,100 recurrent; 1–2/10,000 pt-days

# CDI in the United States

- As of 2006, the CDI epidemic appears ongoing in the United States
- Marked geographic variation in rates of CDI cases and deaths
  - Impacted by the age of the population
- Exact number of CDI cases and deaths unknown
  - $\geq$500,000 CDI cases in 2006
  - $\geq$15,000 deaths caused (or contributed to) by CDI in 2006

# Blood, Organ, and Other Tissue Safety

- Over 50 transfusion and transplant investigations conducted in FY2008
  - HIV, HCV, LCMV, TB, chagas, babesiosis, anaplasmosis
    - >1/2 of all U.S. states and territories involved in suspected disease transmission events
    - most multi-state events, needing CDC coordination

- Blood safety
  - Hemovigilance module in National Healthcare Safety Network through collaboration with AABB
    - Recipient clinical adverse event recognition
    - Transfusion error event recognition
    - Currently set for pilot launch FY2009

- Organ and Tissue Safety
  - Transplantation Transmission Sentinel Network through cooperative agreement with the United Network for Organ Sharing
    - Enhanced communication concerning transmission of infectious diseases and malignancy
    - Pilot will be completed FY2008 (over 1,000 entries in system)

# NEISS-CADES
## Adverse Drug Events

**Annals of Internal Medicine** | ARTICLE

Medication Use Leading to Emergency Department Visits for Adverse Drug Events in Older Adults

National Surveillance of Emergency Department Visits for Outpatient Adverse Drug Events in Children and Adolescents

Emergency Department Visits for Antibiotic-Associated Adverse Events

PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Adverse Events From Cough and Cold Medications in Children

Identifying ADEs in high-risk populations (older adults, children), and ADEs from commonly used medications

Advancing surveillance of ADEs in outpatient settings

Emergency Department Visits for Outpatient Adverse Drug Events: Demonstration for a National Surveillance System

ADEs=adverse drug events

# Involving patients…….

# Keys for the Elimination of Healthcare-associated Infections

- Full adherence to recommendations

- Collect data and disseminate results
  - Communication with consumers
  - Evaluate how we're doing

- Recognize excellence

- Identify and respond to emerging threats

- Improve science for prevention through research

# DHQP Strategic Plan

- Goals
- Objectives
- Strategies  – Public health functions
- Activities and Tasks
- Targets for 2008-20012


- NCPDCID Strategic Plan
- CDC Mission
- HHS Plan

# DHQP Strategic Plan

- Goal 1: Eliminate Healthcare-associated Infections

- Goal 2: Eliminate Occupational Infections among Healthcare Personnel

- Goal 3: Remove Threats to Healthcare Quality

- Goal 4: Provide a Supportive, Growth-oriented Environment within DHQP

# GOAL 1:
# ELIMINATE HEALTHCARE-ASSOCIATED INFECTIONS

Objective 1: Continually reduce healthcare-associated infections related to medical devices and procedures

Objective 2: Continually reduce infections in healthcare and community settings caused by healthcare-associated antimicrobial-resistant organisms

Objective 3: Eliminate failures in basic safe medical practices, including injection safety errors and other "never events"

# GOAL 1:
## ELIMINATE HEALTHCARE-ASSOCIATED INFECTIONS

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# GOAL 1:
## ELIMINATE HEALTHCARE-ASSOCIATED INFECTIONS
## EXAMPLE

Objective 2: Continually reduce infections in healthcare and community settings caused by healthcare-associated antimicrobial-resistant organisms

EXAMPLE TARGET: Reduce by 50% hospital-onset MRSA bloodstream infections.

Strategies for 2008-2012:

Expand capacity to detect and monitor antimicrobial resistance as demonstrated by

- Implementing the NHSN MDRO module by fall of 2008
- Evaluating and reporting national trends in antimicrobial susceptibility patterns of key pathogens by 2010
- Assessing and reporting on antimicrobial use in U.S. healthcare facilities by 2010
- Conducting population-based surveillance for MRSA and *C. difficile* in the Emerging Infections Program through 2012
- Publishing reports on the incidence, characteristics and trends of infections caused by MRSA, *C. difficile*, VRE, multi-drug resistant gram negative rods in U.S. healthcare facilities annually
- Transitioning to electronic reporting of key microorganisms by 2012
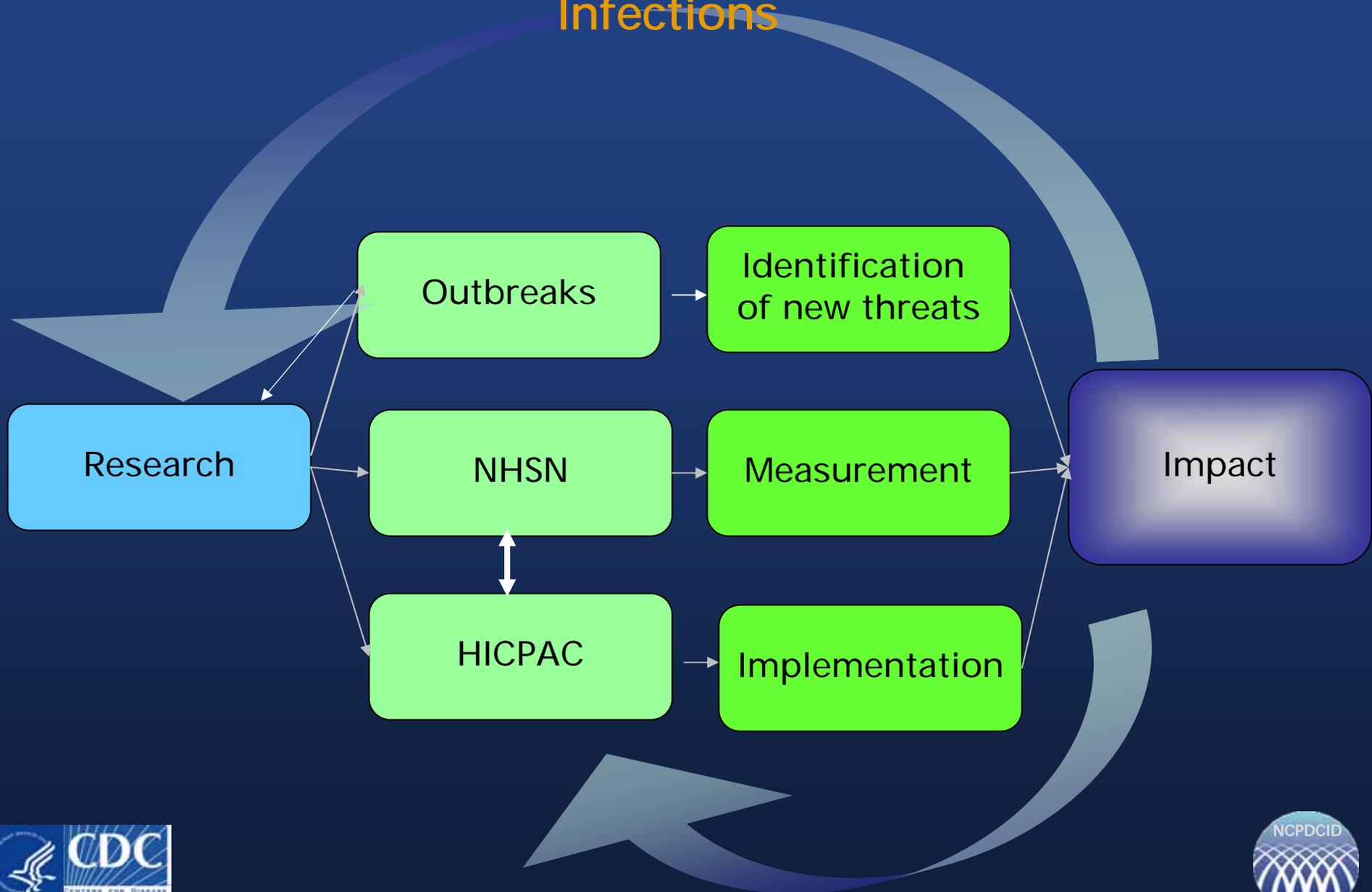- Developing and evaluating laboratory methods to detect antimicrobial resistance

# DHQP Budget Over the Years 2002-2009*
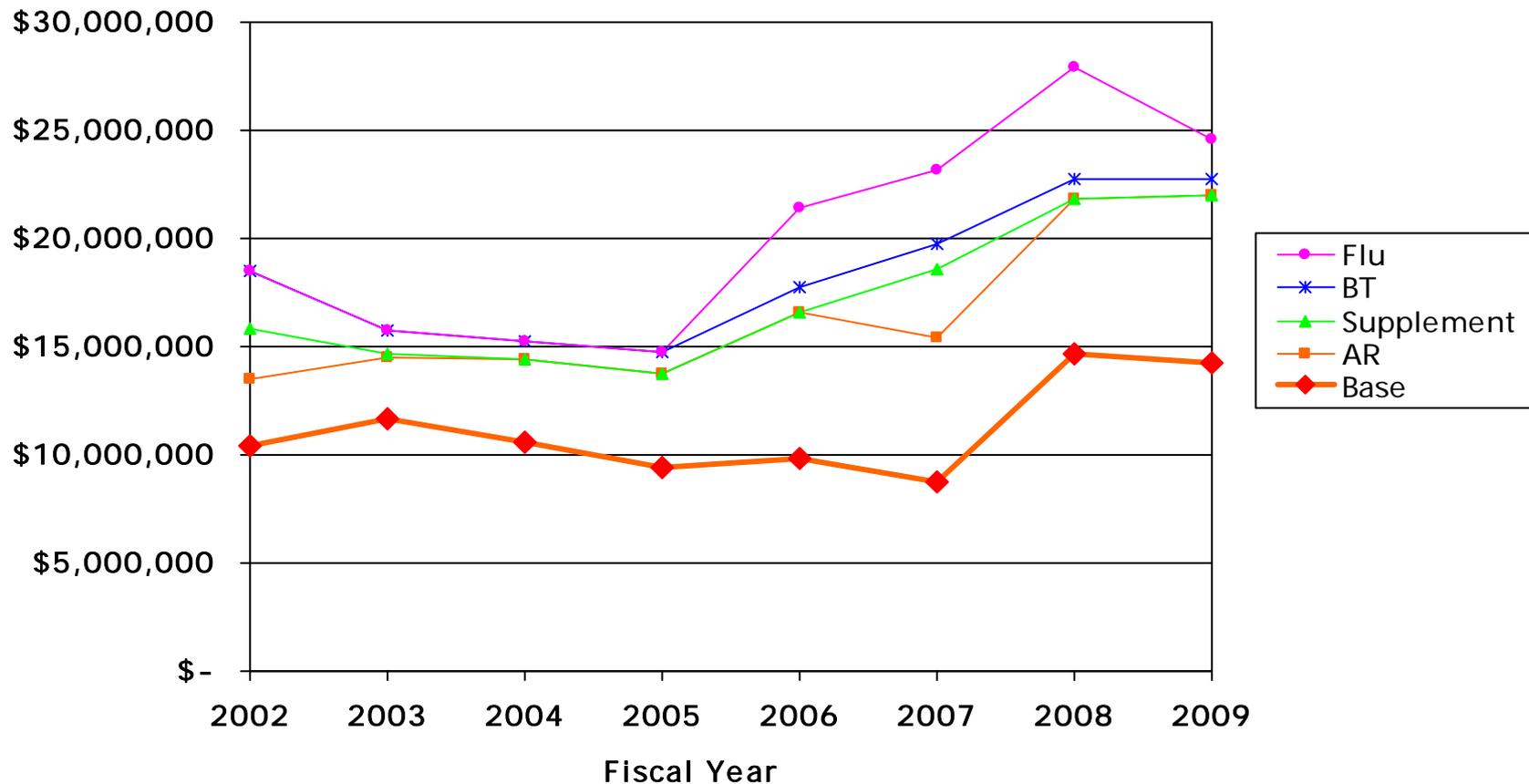


*2009 is provisional

# CDC's Unique Role in Preventing Healthcare-Associated Infections

# Working with Federal Partners

- CMS
- AHRQ
- FDA
- HRSA
- EPA
- NIH
- DoD
- VA

# Moving towards 2009..

- Simplify surveillance and NHSN
- Accelerate the use of electronic data sources
- Support State initiatives for prevention
- Support regional initiatives for prevention
- More collaborations to educate patients/consumers

# Thank You