



Surveillance and Reporting of Healthcare-Associated Infections

Chesley Richards, MD, MPH
Deputy Director

Division of Healthcare Quality Promotion
Centers for Disease Control and Prevention
Atlanta, GA, USA

SAFER • HEALTHIER • PEOPLE™

CDC's Role in preventing healthcare associated infections

- Control
 - Since 1960's, provide outbreak investigation assistance, reference laboratories for MRSA, C. difficile, others
- Surveillance
 - Since 1970, National Nosocomial Infections Surveillance (NNIS) system, NaSH, Dialysis Surveillance Network
- Prevention
 - Since 1981, publish national evidence-based guidelines for healthcare associated infections (HICPAC)
- Research
 - Prevention EpiCenters and other grantees

Collaborations and Partnerships

- Infectious disease
 - APIC, SHEA, IDSA
- Public Health
 - CSTE, state health agencies/departments
- Healthcare Organizations and Institutions
 - AHA, JCAHO, VHA, IHI
- Federal
 - CMS, VA, FDA, AHRQ
- Research
 - Academic centers
- Data organizations
 - HL-7, NQF, NAHDO, state health data organizations, PHC4

A patient in a your hospital...

- Admitted for an elective surgical procedure
- A urinary catheter is placed at time of surgery and is not removed until 3 days later
- At time of discharge, patient has symptoms of urinary tract infection. An antibiotic prescription is given
- Will your surveillance program identify this infection as a healthcare associated infection?
- Does public reporting of this infection result in better, safer care?

Another patient in your city...

- Severe auto accident
- Victim taken to your state's busiest and best trauma center
- Multiple injuries and is near death
- Emergency surgery and a long difficult intensive care stay ensue
- After being in the intensive care unit for 20 days
 - ventilator associated pneumonia
- Discharged after 60 days

- Is this an infection that should be detected by your surveillance system?
- Does public reporting of his pneumonia improve care?

Your grandmother...

- Needs open heart surgery
- The surgery is performed at the best center in your state
- Following the surgery, which goes well, she develops a severe bone infection in her sternum
- After months of repeated hospitalizations and nursing home stays, she dies
- You learn that at the time of surgery, antibiotics to prevent infection were given too late to be effective
- Does reporting her case, improve care?

Payors

Federal government

Consumers

The goal of monitoring and reporting healthcare – associated infections should be to prevent infections.

Healthcare
Providers

Professional organizations

State and local health departments

Patient Safety: Medical Errors and Infections

What proportion of
healthcare infections are
caused by errors...
i.e. are preventable?



**Healthcare-
associated
Infections**

**Medical Errors
and Near-misses**

**Goal: Best quality of patient care
and elimination of preventable
hospital-associated infections**

Surveillance

Information for Action

Public Health Surveillance

Systematic, ongoing

- **Collection**
- **Analysis**
- **Interpretation**
- **Dissemination**
- **Link to public health practice**

1970-2004



2005-



Characteristics



- Started in 1970 with 62 hospitals
 - Currently, 320 hospitals in 42 states
- Participation **voluntary** and **confidential**
- Focused on monitoring infections in critical care and surgery patients
- Requirements
 - Hospitals with at least 100 occupied beds
 - Trained ICPs: 1 FTE ICP per first 100 beds plus 0.5 FTE support staff (median: 1 ICP per 115 beds)
- NNIS hospitals tend to be large, academic institutions with higher average daily census; over-represented in Northeast/Southeast

NNIS: A Model for Patient Safety

- NNIS System is a model for patient safety^{1,2}
 - High quality data used for local performance improvement
 - Reductions in national infection rates have been achieved
- NHSN expands and enhances this model for patient and healthcare personnel safety

¹Leape LL. Reporting of adverse events. NEJM 2002;347:1633-8.

²Burke JP. Infection control—a problem for patient safety. NEJM 2003;348:651-6.

NNIS System Methods

- Focuses on monitoring infections
 - in critical care and surgery
- Uses standard definitions
 - for infections and all data fields
- Uses standard protocols
 - to collect data (i.e., infections and denominators)
- Revises protocols whenever necessary
- CDC publishes reports of aggregated data
 - www.cdc.gov/ncidod/hip/surveill/nnis.htm

Pooled Means and Percentiles of the Distribution of Central Line-associated Bloodstream Infection (BSI) Rates, By Type of ICU, NNIS ICU Component, 1/02-6/04

Central line-associated BSI rate**				Percentile				
Type of ICU	No. of Units	Central Line-Days	Pooled Mean	10%	25%	50% (median)	75%	90%
Coronary	60	116,546	3.5	1.0	1.5	3.2	7.0	9.0
Cardiothoracic	48	182,407	2.7	0.0	0.9	1.8	2.7	4.9
Medical	94	312,478	5.0	0.5	2.4	3.9	6.4	8.8
Medical-Surgical								
Major teaching	100	430,979	4.0	1.7	2.6	3.4	5.1	7.6
All others	109	486,115	3.2	0.8	1.6	3.1	4.3	6.1
Neurosurgical	30	56,645	4.6	0.0	0.9	3.1	5.8	10.6
Pediatric	54	161,314	6.6	0.9	3.0	5.2	8.1	11.2
Surgical	99	358,578	4.6	0.0	2.0	3.4	5.9	8.7
Trauma	22	70,372	7.4	1.9	3.3	5.2	8.2	11.9

** $\frac{\text{Number of central line-associated BSI}}{\text{Number of central line-days}} \times 1000$

NNIS Report 2004; AJIC 32:470-85.

A Decade of Success

Decreases in Hospital-acquired infection rates in NNIS Intensive Care Units

NNIS System, 1990-1999

Type of ICU	Bloodstream*	Pneumonia**	Urinary tract***
Coronary	43%	42%	40%
Medical	44%	56%	46%
Surgical	31%	38%	30%
Pediatric	32%	26%	59%

*central vascular catheter-associated bloodstream infection

**ventilator-associated pneumonia

***catheter-associated urinary tract infection

Preventing infections in hospitals

The Cycle of Success

Is there an important problem?

Comparative external benchmark measures

Do the changes work?

Internal measures

Surveillance

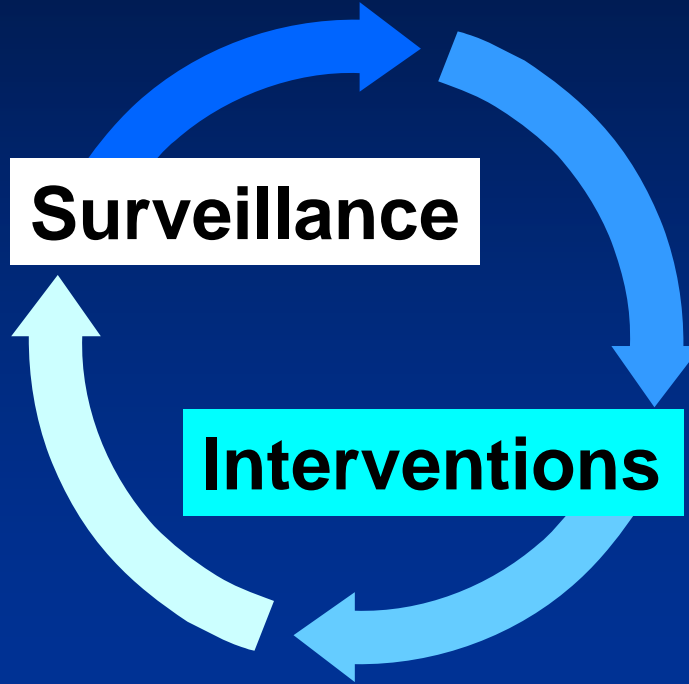
Interventions

Why? What?

Multidisciplinary teams

How to affect change?

*Education,
Guidelines/protocols
Product changes*



Key Features for Success

- Standard definitions for events
- Specified monitoring protocols
- Feedback to participants
- Trained personnel for data collection and for interventions (e.g., infection control practitioners)

Challenges

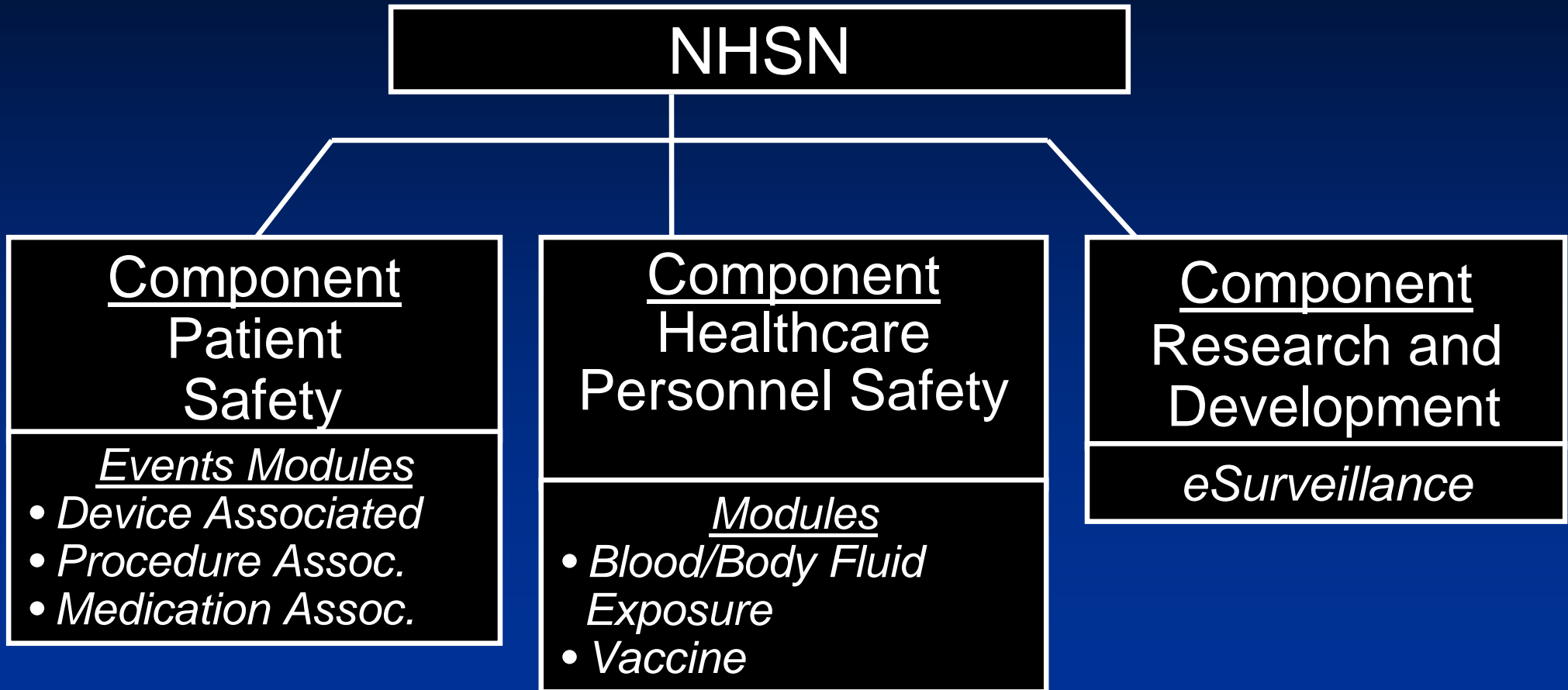
- Data collection burden
 - Opportunity: Transition from primary data collection by hospital staff to automated, electronic reporting
- Standards
 - Opportunity: increase the use of existing data in hospital information systems by having common standards
- Privacy, confidentiality issues

Patient Safety Surveillance



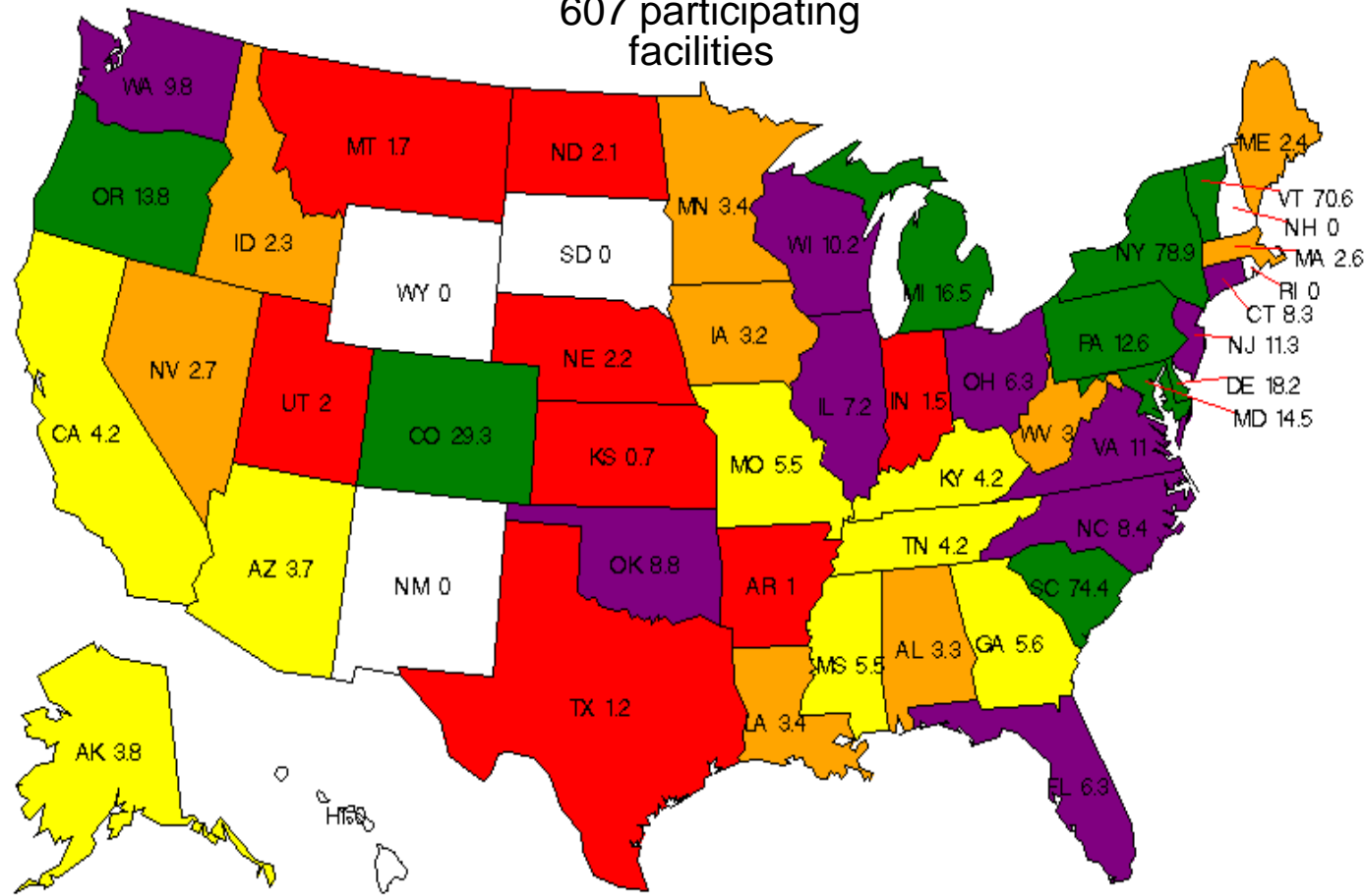
- CDC approach
 - combines facility-level clinical performance measurement with national-level public health surveillance and reporting
- National Healthcare Safety Network (NHSN)
 - 607 healthcare facilities enrolled
 - facilities enter, analyze, report and share data
- Building on collaborations with
 - CMS, AHRQ, VA, and other federal agencies
 - State health departments, academic centers, information technology vendors, professional organizations and other partners

NHSN Components and Modules



Percent of AHA Facilities Enrolled in NHSN by State

607 participating facilities



States with public reporting of health care associated infections

- California
- Colorado
- Connecticut
- Florida
- Illinois
- Maryland
- Missouri
- New Hampshire
- New York
- Pennsylvania
- South Carolina
- Tennessee
- Vermont
- Virginia

Limitations to this approach

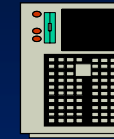
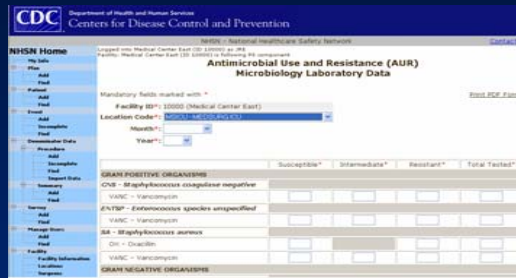
- Primary experience with voluntary, confidential reporting
- At present does not provide whole facility reporting
- Labor intensive
- Not tied to utilization or billing data directly
 - DRGs, ICD9/10, etc.
- Complex

Present activities

Future opportunities

Healthcare Facility

CDC



Rules for Security,
Primary Data Entry,
and Supplemental
Data Entry

NHSN Application

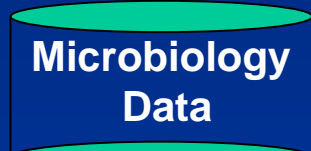
Secure
Internet
Transmission



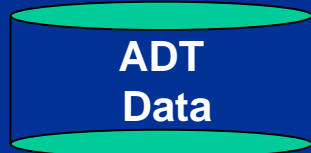
NHSN
Database



Pharmacy
Data



Microbiology
Data



ADT
Data

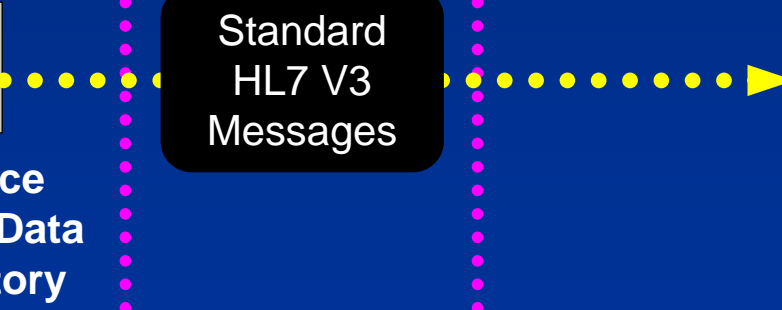
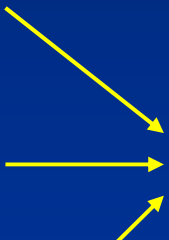
Facility
Firewall

CDC
Firewall

Interface
Engine/ Data
Repository

Standard
HL7 V3
Messages

Parsing
Coding
Validating



Public Reporting of Healthcare Associated Infections

Healthcare Infection Control Practices Advisory Committee (HICPAC)

- Federal advisory committee
- 14 external infection control experts
 - Representatives from AHRQ, CMS, AHA, JCAHO, State public health departments
- Advise and guide CDC and the Secretary of the Department of Health and Human Services (HHS)
- Regarding:
 - the practice of health care infection control
 - strategies for surveillance, prevention, and control of health care associated infections

Guidance on Public Reporting of Healthcare-Associated Infections: Recommendations of the Healthcare Infection Control Practices Advisory Committee

(Am J Infect Control 2005;33:217-26.)

Linda McKibben, MD,^a Teresa Horan, MPH,^b Jerome I. Tokars, MD, MPH,^b Gabrielle Fowler, MPH,^b Denise M. Cardo, MD,^a Michele L. Pearson, MD,^c Patrick J. Brennan, MD,^d and the Healthcare Infection Control Practices Advisory Committee*

Since 2002, 4 states have enacted legislation that requires health care organizations to publicly disclose health care-associated infection (HAI) rates. Similar legislative efforts are underway in several other states. Advocates of mandatory public reporting of HAIs believe that making such information publicly available will enable consumers to make more informed choices about their health care and improve overall health care quality by reducing HAIs. Further, they believe that patients have a right to know this information. However, others have expressed concern that the reliability of public reporting systems may be compromised by institutional variability in the definitions used for HAIs, or in the methods and resources used to identify HAIs. Presently, there is insufficient evidence on the merits and limitations of an HAI public reporting system. Therefore, the Healthcare Infection Control Practices Advisory Committee (HICPAC) has not recommended for or against mandatory public reporting of HAI rates. However, HICPAC has developed this guidance document based on established principles for public health and HAI reporting systems. This document is intended to assist policymakers, program planners, consumer advocacy organizations, and others tasked with designing and implementing public reporting systems for HAIs. The document provides a framework for legislators, but does not provide model legislation. HICPAC recommends that persons who design and implement such systems 1) use established public health surveillance methods when designing and implementing mandatory HAI reporting systems; 2) create multidisciplinary advisory panels, including persons with expertise in the prevention and control of HAIs, to monitor the planning and oversight of HAI public reporting systems; 3) choose appropriate process and outcome measures based on facility type and phase in measures

HICPAC Recommendations

1. Use **established public health surveillance methods** when designing and implementing mandatory HAI reporting systems
2. **Create a multidisciplinary advisory panel** to monitor the planning and oversight of the operations and products of HAI public reporting systems
3. Choose **appropriate process and outcome measures** based on facility type and **phase in measures** over time to allow time for facilities to adapt and to permit ongoing **evaluation** of data validity
4. Provide regular and confidential **feedback** of performance data to healthcare providers

Potential Adverse Consequences of Public Reporting Systems

- Diversion of resources
 - away from patient care and prevention programs
- Creation of disincentives
 - to treat patients at higher risk for HAI
- Misuse of current standard methods
 - for HAI surveillance, which were developed for voluntary use
- Mislead stakeholders
 - if inaccurate data are disseminated

A few final thoughts

- Public reporting has been a good thing...
 - brought attention, spurred interest, and pushed us forward
 - BUT, we should be cognizant of the potential unintended harms
- CDC's role
 - To assist in thinking about measurement issues
 - Providing prevention guidelines
 - Working through partnerships and collaborations