



# Surveillance and Reporting of Healthcare-associated Infections

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*No conflicts of interest to disclose*

**SAFER • HEALTHIER • PEOPLE™**



# Objectives

- Define surveillance and why we do it
- Describe 7 essential elements of surveillance
- Briefly describe the national HAI surveillance system used in the USA

# Surveillance



## CDC Definition

**“The ongoing, systematic collection, analysis, and interpretation of health data essential to the planning, implementation, and evaluation of public health practice, closely integrated with the timely dissemination of these data to those who need to know.”**



# Purposes of Surveillance

- Improve patient outcomes
- Obtain “baseline” data
- Identify problems
- Evaluate control interventions







# Purposes of Surveillance



- Monitor quality of infection control practices
- Educate health-care providers
- Determine research / study needs
- Satisfy regulatory / accreditation requirements



# Which Infections to Survey?

## Epidemic vs. Endemic

- Fewer than 10% of all HAIs occur in recognized outbreaks\*
- Ongoing surveillance measures the endemic rates of various infections so that we can recognize problems as they surface
- High endemic rates usually require addressing multiple problems

Stamm W et al., Am J Med 1981;70:393-397.



# Essential Elements

1. Assess the population
2. Select the event or process to survey
3. Choose the surveillance method(s) keeping in mind the need for risk-adjustment of data
4. Monitor for the event or process

Lee TB et al. Recommended practices for surveillance. Am J Infect Control 2007;35(7):427-440.

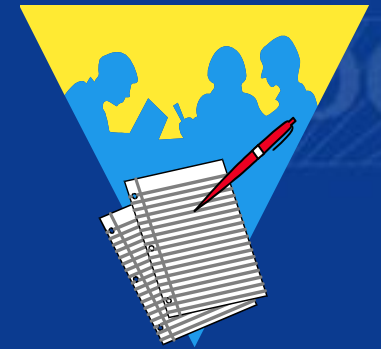


# Essential Elements

5. Apply surveillance definitions during monitoring
6. Analyze and report the data
7. Use the data to drive prevention efforts

Lee TB et al. Recommended practices for surveillance. Am J Infect Control 2007;35(7):427-440.

# Element 1: Assess the Population



Characterize and prioritize “at-risk” patients

- What types of patients do you serve?
- What are the most common diagnoses?
- What are the most frequently performed procedures?
- Which services are utilized most often?
- Which patients increase organization’s cost or liability?

# Element 2: Select Event or Process to Survey



- Relative frequency of the event / process
- Cost or impact of a specific negative event / outcome
- Preventability
- Organizational mission / strategic goals
- Available resources

# Element 2: Select Event or Process to Survey



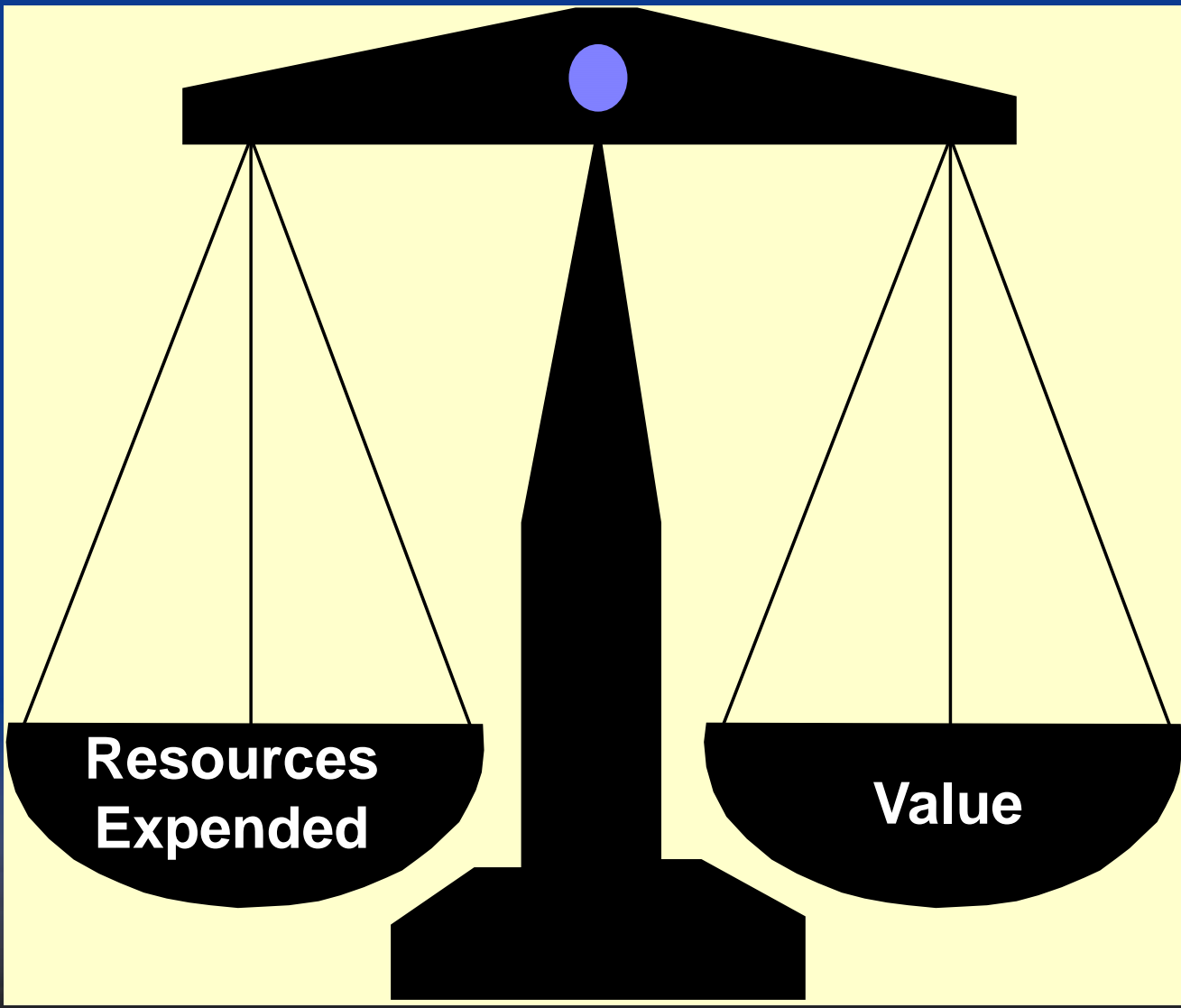
- Include key stakeholders in selection process
- Consider the time frame for each surveillance initiative
- Allocate resources according to surveillance priorities
- Get administrative support / commitment
- Develop a written surveillance plan



# Surveillance Plan



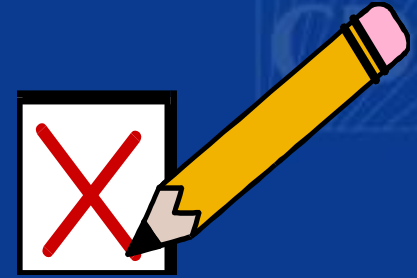
- List surveillance initiatives that make up your plan
- Clearly describe each initiative
  - Purpose
  - Eligible patient population
  - Duration and frequency of monitoring
  - Data sources
  - Definitions of numerator and denominator (if any)
  - Analysis, including calculations
  - Dissemination plan (who, what, how often)



**Resources  
Expended**

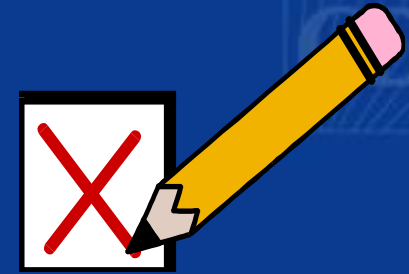
**Value**

# Element 3: Choose the Method



- Active vs. passive
- Prospective vs. retrospective
- Patient- vs. laboratory-based
- Incidence vs. prevalence

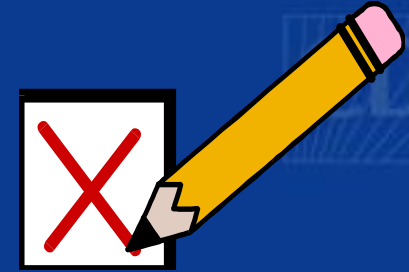
# Element 3: Choose the Method



## Active vs. Passive

- Active: Trained personnel use various data sources to identify events
  - In USA, infection prevention specialists collect HAI data
  - Other staff can be trained to collect denominator and process measure data
- Passive: Non-trained personnel identify and report events to you

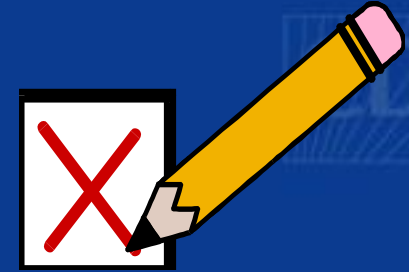
# Element 3: Choose the Method



## Prospective vs. Retrospective

- Prospective: Monitoring patients while still in the institution; includes post-discharge period for SSI
  - Visibility of IP specialist on wards
  - Timely analysis and feedback
  - Labor intensive; costly
- Retrospective: Case-finding based solely on chart review after patient discharged

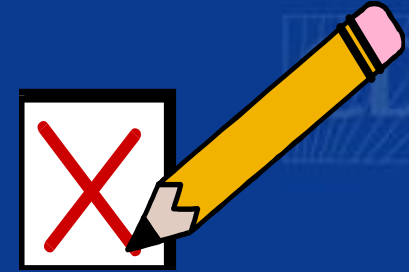
# Element 3: Choose the Method



## Patient- vs. Laboratory-based

- Patient-based: Monitoring patients for events, risk factors, and procedures and practices related to patient care
  - Requires ward rounds
  - Includes discussions with caregivers
- Laboratory-based: Case-finding based solely on positive lab findings
  - Events may be missed
  - Colonization

# Element 3: Choose the Method



## Incidence vs. Prevalence

- Incidence: Measure **new** events occurring during some defined time period
- Prevalence: Measure **all** events occurring at either a point in time or during some defined time period
  - Useful to get a sense of the magnitude of the event

# Element 4: Monitor for the Event or Process



- Develop data collection form for each surveillance initiative
  - Limit data collection to only what is needed for meeting the specific objective
  - Design forms considering flow of patient charts / data sources and ease of data recording / entry
- Maintain consistent surveillance intensity over time and across data collectors

# Element 4: Monitor for the Event or Process



- Use all available information systems
  - Administrative databases
  - Patient charts / records
  - Communication with caregivers
  - Ancillary service reports
- Employ a team approach; negotiate for assistance
  - Provide standardized training

# Element 5: Apply Surveillance Definitions



- Use standardized definitions of HAI consistently
  - Enhance the accuracy of data
  - Modifications have implications
- Clearly define all data elements for surveillance (i.e., criteria for risk factors and denominators)

# Element 6: Analyze and Report the Data

- Express data in numerical terms (i.e., ratios, proportions, rates)
- Display graphically; dashboards
- Determine whether observed differences in rates and ratios are meaningful; interpret findings for your audience
- Report the data in a timely manner



# Element 7: Use the Data to Drive Prevention Efforts

- Present surveillance information in a manner to stimulate ideas for process improvement
- Perform follow-up surveillance to determine whether change has occurred



*Surveillance without action  
should be abandoned*

# National Healthcare Safety Network

- Nearly 5000 facilities
- All sizes and types
- Trained infection prevention specialists
- Active, prospective, patient-based, incidence surveillance using standard definitions and protocols

[www.cdc.gov/nhsn](http://www.cdc.gov/nhsn)

- Internet-based application



2005 - ongoing

# **CDC/NHSN surveillance definition of health care–associated infection and criteria for specific types of infections in the acute care setting**

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Atlanta, Georgia

## **BACKGROUND**

Since 1988, the Centers for Disease Control and Prevention (CDC) has published 2 articles in which nosocomial infection and criteria for specific types of nosocomial infection for surveillance purposes for use in

population for which clinical sepsis is used has been restricted to patients  $\leq 1$  year old. Another example is that incisional SSI descriptions have been expanded to specify whether an SSI affects the primary or a secondary incision following operative procedures in which more than 1 incision is made. For additional information about

[http://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef\\_current.pdf](http://www.cdc.gov/nhsn/PDFs/pscManual/17pscNosInfDef_current.pdf)

# Pooled Means and Key Percentiles of the Distribution of Central Line-associated Bloodstream Infection (BSI) Rates for Selected Adult ICUs, NHSN DA Module, 2009

Type of ICU	Central line-associated BSI rate**			Percentile				
	No. of Units	Central Line-Days	Pooled Mean	10%	25%	50% (median)	75%	90%
Burn	33	36,355	5.3	0.2	1.8	3.8	5.9	12.4
Coronary	252	330,123	1.7	0.0	0.0	1.1	2.5	4.2
Cardiothoracic	219	460,406	1.2	0.0	0.0	0.8	1.7	2.5
Medical (maj teach)	191	293,177	1.6	0.0	0.0	1.1	2.4	4.1
Medical (others)	153	362,388	1.9	0.0	0.0	1.0	2.4	4.3
Medical-Surgical								
Major teaching	192	446,751	1.7	0.0	0.3	1.3	2.4	3.8
Others ≤15 beds	837	693,747	1.4	0.0	0.0	0.0	1.8	3.8
Others >15 beds	324	871,750	1.3	0.0	0.3	0.9	1.8	3.0
Neurosurgical	79	129,732	1.5	0.0	0.3	1.2	2.5	3.6
Surgical	223	466,224	1.8	0.0	0.5	1.2	2.5	4.2
Trauma	74	168,784	2.6	0.0	0.7	2.0	3.7	6.7

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



## Trends

- From 2001 to 2009, 57% fewer CLABSI in ICU patients with central lines
- 27,000 lives saved
- \$1.8B saved in excess costs

**1 in 20**



About 1 in 20 patients gets an infection each year while receiving medical care.

**41,000**

About 41,000 bloodstream infections strike hospital patients with central lines each year.

**37,000**

About 37,000 bloodstream infections happen each year to kidney dialysis patients with central lines.

## Making Health Care Safer

### Reducing bloodstream infections

A central line is a tube that a doctor usually places in a large vein of a patient's neck or chest to give important medical treatment. When not put in correctly or kept clean, central lines can become a freeway for germs to enter the body and cause serious bloodstream infections. These infections can be deadly. Of patients who get a bloodstream infection from having a central line, up to 1 in 4 die. Bloodstream infections in patients with central lines are largely preventable when healthcare providers use CDC-recommended infection control steps. Medical professionals have reduced these infections in hospital intensive care unit (ICU) patients by 58% since 2001. Even so, many still occur in ICUs, in other parts of hospitals, and in outpatient care locations. In 2008, about 37,000 bloodstream infections occurred in hemodialysis\* outpatients with central lines.

\*Use of a machine to clean or filter the blood when kidneys no longer work.

Learn what you can do to reduce central line bloodstream infections.

→ See page 4

Want to learn more? Visit

[www.cdc.gov/vitalsigns](http://www.cdc.gov/vitalsigns)





# Surveillance Resources

- National Healthcare Safety Network:  
[www.cdc.gov/nhsn](http://www.cdc.gov/nhsn)
  - Protocols, definitions, forms, training
- Hospital Epidemiology and Infection Control, 4<sup>th</sup> ed., C. G. Mayhall, editor (available Oct 2011)
- APIC Text of Infection Control and Epidemiology, 3<sup>rd</sup> ed., 2009