



DEVELOPMENT OF AN INFECTION CONTROL PROGRAM FOR ACUTE CARE FACILITIES

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OBJECTIVES

- ▶ Describe the problem of healthcare-associated infection
- ▶ Review factors influencing the evolution of infection control/prevention programs
- ▶ Discuss core components of an effective infection prevention program
 - ▶ Administrative support
 - ▶ Written program
 - ▶ Surveillance Plan
 - ▶ Staff Training and Education

DEMOGRAPHICS

- ▶ One out of thirty-one patients in U.S. hospitals has at least one healthcare-associated infection (HAI)¹
- ▶ One out of 25 patients in U.S. hospitals contracts and HAI²
- ▶ Two million acquire annually²
- ▶ 90,000 deaths²
- ▶ Cost range \$1,000 to nearly \$50,000²

¹CDC Progress Report

²The Leapfrog group

NATIONAL DATA FOR ACUTE CARE HOSPITALS, YEAR 2016

National Data by HAI Type

HAI Type	# OF FACILITIES THAT REPORTED DATA TO CDC'S NHSN, 2016 [†]	2016 NATIONAL SIR VS. 2015 NATIONAL SIR	2016 NATIONAL SIR VS. NATIONAL BASELINE	2016 NATIONAL SIR
CAUTI	3,644	↓ -6%	↓ -7%	0.93
CLABSI	3,531	↓ -10%	↓ -11%	0.89
SSI: Colon Surgery	3,133	↓ -7%	↓ -7%	0.93
SSI: Abdominal Hysterectomy	2,986	↓ -13%	↓ -13%	0.87
MRSA Bacteremia	3,602	↓ -6%	↓ -6%	0.94
VAE	1,953	↓ -2%	↓ -2%	0.98
<i>C. difficile</i> Events	3,605	↓ -7%	↓ -8%	0.92

<https://www.cdc.gov/hai/data/portal/progress-report.html>

HEALTHCARE-ASSOCIATED INFECTIONS

[HTTPS://EPI.PUBLICHEALTH.NC.GOV/CD/HAI/FIGURES/HAI_MAY2018_ANNUAL_V2.PDF](https://epi.publichealth.nc.gov/cd/hai/figures/hai_may2018_annual_v2.pdf)

Table 1. N.C. Central Line Associated Bloodstream Infections (CLABSI) in Adult/Pediatric Medical, Surgical and Medical/Surgical Wards & ICUs, 2017

Year	# Observed Infections	# Predicted Infections	How Does North Carolina Compare to the National Experience?
2017	533	520.58	= Same: about the same number of infections as were predicted (same as the national experience)

Table 5. N.C. Catheter-Associated Urinary Tract Infections (CAUTI) in ICUs and wards, by year, 2012-2016

Year	# Observed Infections	# Predicted Infections	How Does North Carolina Compare to the National Experience?
2017	637	717.3	★ Better: Fewer infections than were predicted (better than the national experience)

Table 6. N.C. Methicillin-Resistant Staphylococcus Aureus Laboratory-Identified events, by year, 2012-2016

Year	# Observed Events	# Predicted Events	How Does North Carolina Compare to the National Experience?
2017	279	355.5	★ Better: Fewer infections than were predicted (better than the national experience)

Table 7. N.C. Clostridium difficile laboratory-identified events, by year, 2012-2016

Year	# Observed Infections	# Predicted Infections	How Does North Carolina Compare to the National Experience?
2013	2696	3487.90	★ Better: Fewer infections than were predicted (better than the national experience)

Table 4. N.C. Surgical Site Infections following Abdominal Hysterectomies, by year, 2012-2016

Year	# Observed Infections	# Predicted Infections	How Does North Carolina Compare to the National Experience?
2017	49	86.22	★ Better: Fewer infections than were predicted (better than the national experience)

Table 5. N.C. Surgical Site Infections following colon surgeries, by year, 2012-2016

Year	# Observed Infections	# Predicted Infections	How Does North Carolina Compare to the National Experience?
2017	253	302.8	★ Better: Fewer infections than were predicted (better than the national experience)

Tens of thousands of Americans die each year as a result of preventable hospital errors



Condition	What We Found	Potentially Preventable complications or Deaths* (Annual)
Hypertension	Less than 65% received indicated care	68,000 deaths
Heart Attacks	39-55% did not receive needed medication	37, 000 deaths
Pneumonia	36% of elderly received no vaccine	10, 000 deaths
Colorectal Cancer	62% not screened	9, 600 deaths

ALL OF THIS IS OLD NEWS...RIGHT??

NEWS

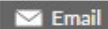
NEW JERSEY KNEE PAIN CLINIC
CLOSES AFTER IMPROPERLY
HANDLED INJECTIONS LEAD TO
INFECTION



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HEALTH AND HUMAN SERVICES

HAI ACTION PLAN

Table 1: 2020 National Acute Care Hospital HAI Metrics

Measure (and data source)	Progress made by 2016	2020 Target (from 2015 baseline)
CLABSI (NHSN) ¹	10% reduction	50% reduction
CAUTI (NHSN) ¹	6% relative reduction	25% reduction
Invasive MRSA (NHSN/EIP ²)	8% reduction	50% reduction
Hospital-onset MRSA (NHSN)	6% reduction	50% reduction
Hospital-onset CDI (NHSN)	7% reduction	30% reduction
SSI (NHSN)	Data to be released in 2018	30% reduction
<i>Clostridium difficile</i> hospitalizations (HCUP) ³	Data pending release	30% reduction

- ▶ *“The field of infection prevention emerged from the results of the Study of the Efficacy of Nosocomial Infection Control (SENIC), which demonstrated that strategies such as surveillance and feedback led to sizeable decreases in hospital-acquired infections”*

UpToDate:

Infection prevention: General principles

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EVOLUTION OF SURVEILLANCE PROGRAMS

- ▶ 1958: AHA recommended in response to outbreaks of *Staphylococcus aureus* infections in hospitals.
- ▶ 1960's: CDC recommended hospital base programs include surveillance
- ▶ 1976: TJC first included infection surveillance, prevention and control standards in its accreditation manual

THE SENIC PROJECT. STUDY ON THE EFFICACY OF NOSOCOMIAL INFECTION CONTROL.



- CDC undertook in 1974
- Three primary objectives:
 - To determine whether (and, if so, to what degree) the implementation of infection surveillance and control programs (ISCPs) has lowered the rate of nosocomial infection,
 - To describe the current status of ISCPs and infection rates, and
 - To demonstrate the relationships among characteristics of hospitals and patients, components of ISCPs, and changes in the infection rate.

SENIC FINDINGS

- SENIC found that hospitals reduced their nosocomial infection rates by approximately 32% if their infection surveillance and control program included four components:
 - Appropriate emphases on surveillance activities and vigorous control efforts,
 - At least one full-time infection-control practitioner per 250 beds,
 - A trained hospital epidemiologist, and
 - For surgical wound infections (SWIs), feedback of wound infection rates to practicing surgeons.

HEALTHCARE FACILITY HAI REPORTING TO CMS VIA NHSN:

Acute Care Hospitals		
HAI Event	Facility Type	Start Date
CLABSI	Acute Care Hospitals Adult, Pediatric, and Neonatal ICUs	January 2011
CAUTI	Acute Care Hospitals Adult and Pediatric ICUs	January 2012
SSI	Acute Care Hospitals Colon and abdominal hysterectomy procedures	January 2012
MRSA Bacteremia LabID Event	Facility Wide Inpatient	January 2013
<i>C difficile</i> LabID event	Facility Wide Inpatient	January 2013
HCP Influenza Vaccination	All Inpatient HCP	January 2013
Medicare Beneficiary Number	All Medicare Patients Reported into NHSN	July 2014
CLABSI	Adult and Pediatric Medical, Surgical and Medical/Surgical Units	January 2015
CAUTI	Adult and Pediatric Medical, Surgical and Medical/Surgical Units	January 2015

What do you mean
our CLABSI SIR
was 2.4

Hmm.....,
wonder what an
SIR is

CEO

IP

EVOLUTION OF TERMINOLOGY

Program Terminology

- ▶ Infection Control
- ▶ Infection Prevention
- ▶ Nosocomial
- ▶ Hospital acquired
- ▶ Healthcare-associated infection
- ▶ Health care epidemiology

**PREVENTION
WORKS!**

Staffing Terminology

- ▶ Infection Control Nurse
- ▶ Infection Control Officer
- ▶ Infection Control Professional
- ▶ Infection Preventionist
- ▶ Infectious Disease Physician
- ▶ Hospital Epidemiologist



WHAT ARE THE CORE INFECTION PREVENTION PRACTICES?

- The core set of infection prevention and control practices should be implemented in **all** healthcare settings
- Applies to inpatient settings, outpatient settings, and non-traditional healthcare settings (e.g., homes, pharmacies, health fairs)
- There are eight core practices:
 - **Leadership Support**
 - **Education and Training of Healthcare Personnel on Infection Prevention**
 - **Patient, Family and Caregiver Education**
 - **Performance Monitoring and Feedback**
 - Standard Precautions
 - Transmission-Based Precautions
 - Temporary Invasive Medical Devices for Clinical Management
 - Occupational Health

<https://www.cdc.gov/hicpac/pdf/core-practices.pdf>

CORE PRACTICE: LEADERSHIP SUPPORT

- ▶ Infection prevention programs require visible and tangible support from all levels of leadership
 - ▶ Ensure the Governing body (Board of directors, Administration) is accountable for the success of infection prevention activities
 - ▶ Allocate sufficient human and material resources (e.g., personnel, space, equipment, supplies)
 - ▶ Assign qualified individuals with relevant training to manage the program (e.g. course, certification)
 - ▶ Empower and support for those managing the program (e.g., authority, continuing education)
 - ▶ Authority statement included in the written program

INFECTION PREVENTION PROGRAM

- ▶ Effective infection control programs prevent HAIs
- ▶ A comprehensive infection control program consists of numerous elements including:
 - ▶ Evidence-based written policies and procedures
 - ▶ Training and education
 - ▶ Healthcare personnel safety
 - ▶ Surveillance and disease reporting
- ▶ Activities should reflect the type of care provided, infection risks, and population served
- ▶ Conducting infection control program assessments can help to identify program strengths and weaknesses
- ▶ Assessment findings can be utilized for staff education and improved patient outcome

INFECTION PREVENTION TEAM

▶ Infection prevention committee

- ▶ Multi-disciplinary
- ▶ Not required by TJC but some states do require
- ▶ Dissemination of information is critical

▶ Infection preventionist

- ▶ Daily collaboration with all facets of healthcare
- ▶ Functions as consultant, educator, role model, researcher and change agent

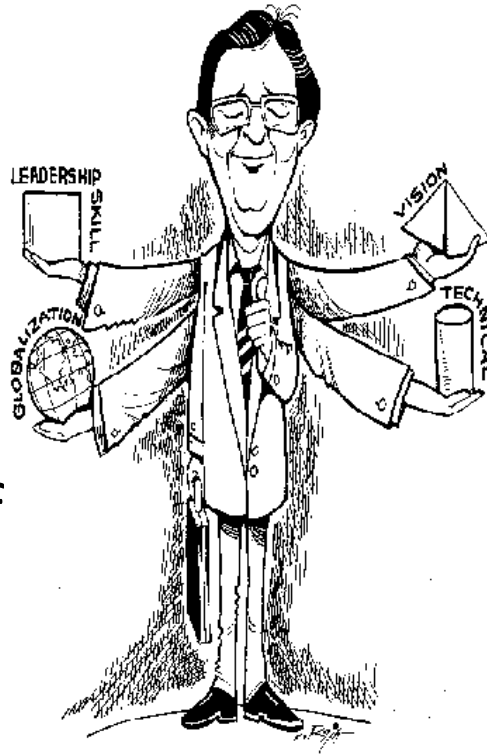
▶ Healthcare epidemiologist

- ▶ May be the chair of committee or be technical advisory
- ▶ Often physician with special training in healthcare epidemiology and infection prevention



INFECTION PREVENTIONIST

- ▶ Collection and analysis of infection data
- ▶ Evaluation of products and procedures
- ▶ Development of policies
- ▶ Consultation
- ▶ Education



- ▶ Implementation of mandated changes
- ▶ Application of epidemiologic principles
- ▶ Antimicrobial management
- ▶ Research
- ▶ High quality services in a cost-efficient manner

STAFFING

- ▶ 1969
 - ▶ CDC recommended 1 FTE per 250 occupied beds (SENIC) acute care
- ▶ 2004
 - ▶ Health Canada model projected 3 FTE per every 500 beds in acute care
- ▶ Netherlands
 - ▶ 1 FTE per 178 beds acute care
- ▶ APIC's Delphi project
 - ▶ 0.8-1 IP for every 100 occupied beds, acute care
- ▶ LTC
 - ▶ Health Canada 1 FTE per 150-250 beds
 - ▶ Delphi project 0.8 per 100 beds and 3 per 500 beds
 - ▶ Dutch group 500 hours per 100 residents per year

WRITTEN POLICIES AND PROCEDURES

- ▶ Approved by the infection prevention committee
- ▶ Reviewed and/or revised on a regular basis (don't forget about contract services)
 - ▶ CMS annual review
 - ▶ TJC every three years
- ▶ Facility wide policies
 - ▶ Hand hygiene
 - ▶ Transmission-based precautions
 - ▶ High level disinfection
- ▶ Department specific policies
 - ▶ Based on unique characteristics of the department (pharmacy, environmental services etc.,)



EDUCATION AND TRAINING OF HEALTHCARE PERSONNEL ON INFECTION PREVENTION

- ▶ Training should be adapted to reflect the diversity of the workforce and the type of facility, and tailored to meet the needs of each category of healthcare personnel trained
 - ▶ Job-specific, infection prevention education and training
 - ▶ Processes to ensure that personnel are competent
 - ▶ Written policies and procedures
 - ▶ Training before duties can be performed and at least annually
 - ▶ Additional training to recognized lapses in adherence



ESSENTIAL ELEMENTS TO ADDRESS

- ▶ All relevant healthcare personnel included in training
- ▶ Training conducted upon hire, before provision of care/specific procedures
- ▶ At least annually and when new equipment or protocols are introduced
- ▶ Include specific elements of competency by domain
- ▶ Require HCP to demonstrate competency following each training
- ▶ System of documentation of competency for each healthcare personnel



COMPETENCY



Assessment

(return demonstration)

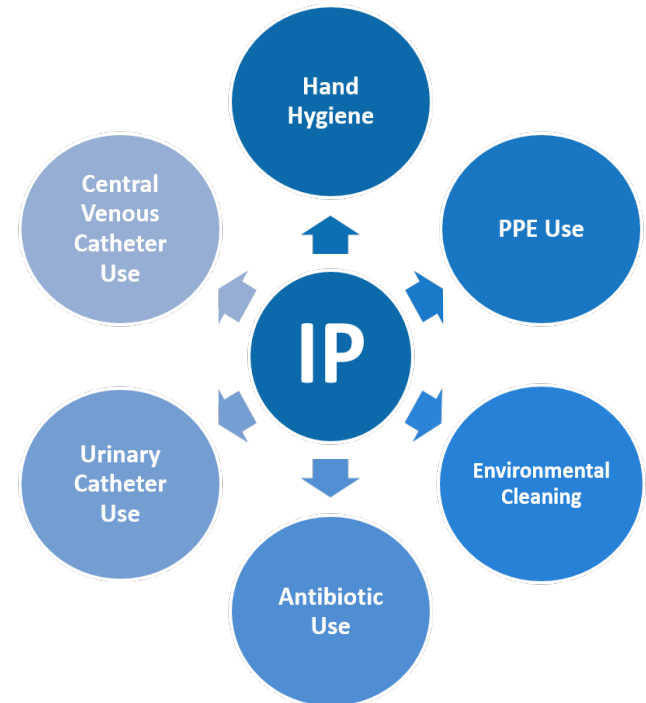
- ▶ Initial or Core Competency
 - ▶ Orientation
- ▶ Ongoing competency
 - ▶ Annually or when new skills/knowledge is introduced
- ▶ Specialized competency
 - ▶ Related to area of specialization, such as infection prevention, disinfection/sterilization etc.

Competency-Based Training Tools

- ▶ CDC Targeted Assessment for Prevention (TAP) Implementation Tools
 - ▶ Hand hygiene and gloving
 - ▶ Urinary catheter insertion and maintenance
 - ▶ Environmental cleaning
- ▶ World Health Organization
 - ▶ Hand hygiene training kit

MONITORING PERFORMANCE: AUDITS

- ▶ Quality audits are performed to verify conformance to standards through objective review.
- ▶ Should be an opportunity for improvement and not punitive
- ▶ Audits can assist the facility in:
 - ▶ Establishing a baseline of performance for each activity
 - ▶ Identifying what needs to be improved, and
 - ▶ Targeting educational needs



WHY MEASURE PERFORMANCE?

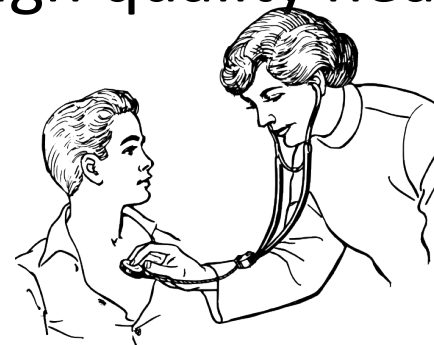
- ▶ There are many reasons why an organization should measure performance:
- ▶ **Quality Improvement.**
 - ▶ Measuring performance can tell you what you're doing well so you can share your successes and also reveal areas where you need to make adjustments. Measuring performance tells you whether you are achieving your ultimate goal of improving patient outcomes.
- ▶ **Transparency.**
 - ▶ Stakeholders outside of the organization--patients, funders, patient advocates--want to know about the quality of care being provided. Patients want information that allows them to make informed choices about their health care services. Sharing performance information can also help an organization gain support and funding for its programs.

U.S. Department of Health and Human Services Health Resources and Services Administration

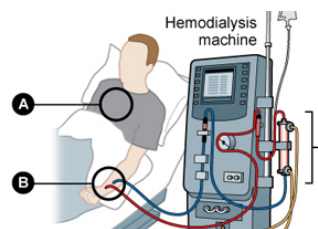
WHAT IS HEALTH CARE QUALITY?

▶ Every one has his/her definition of high quality health care

▶ Go to their doctor of choice



▶ Receive any care they believe they need



▶ Go to the hospital and not get an infection or suffer from some injury as a result of care



WHAT IS HEALTH CARE QUALITY?

- ▶ Department of Health and Human Services (HHS) established the National Quality Strategy
 - ▶ Priorities:
 - ▶ Better Care: patient-centered, reliable, accessible
 - ▶ Healthy People/Healthy Communities: Support proven interventions
 - ▶ Affordable Care: Reduce the cost of quality health care for individuals, families, employers and government
- ▶ Agency for Healthcare Research and Quality (AHRQ) defines quality health care:
 - ▶ *“as doing the right thing for the right patient, at the right time, in the right way to achieve the best possible results”*

INSTITUTE OF MEDICINE (IOM)

[NATIONAL ACADEMY OF MEDICINE]

▶ To Err is Human

- ▶ Released in 1999 concluded that it is not acceptable for patients to be harmed by the healthcare system that is supposed to offer healing and comfort—a system that promises “first do no harm”

▶ Crossing the Quality Chasm

- ▶ Released in 2001 noted between the healthcare that we now have and the healthcare that we could have lies not just a gap but a chasm

▶ Improving Diagnosis in Health Care

- ▶ Released in 2015 stated “improving the diagnostic process is not only possible but also represents a moral, professional, and public health imperative”. *The committee concluded that most people will experience at least one diagnostic error in their lifetime, sometimes with devastating consequences*

HEALTH CARE QUALITY .. INFECTION PREVENTION

QUALITY (*IOM DEFINITION*)

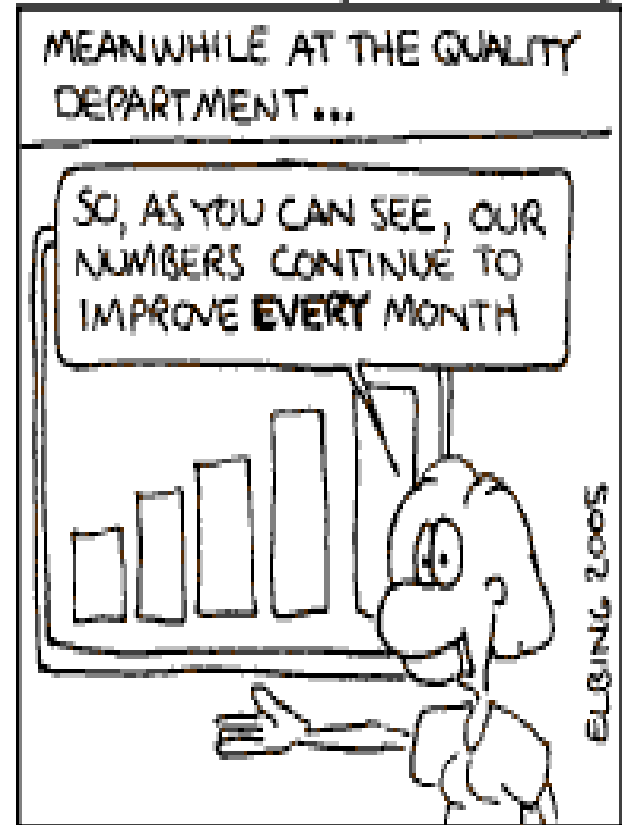
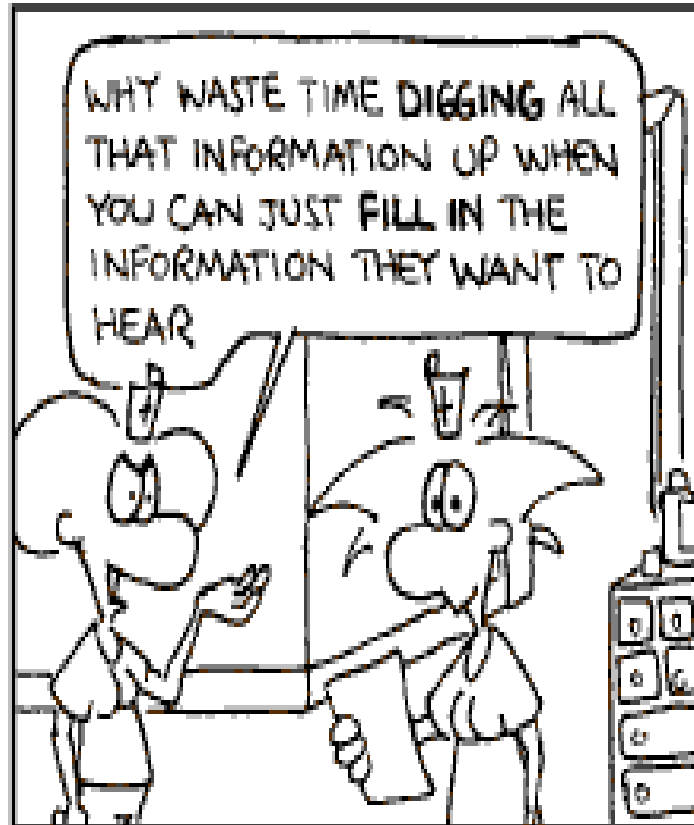
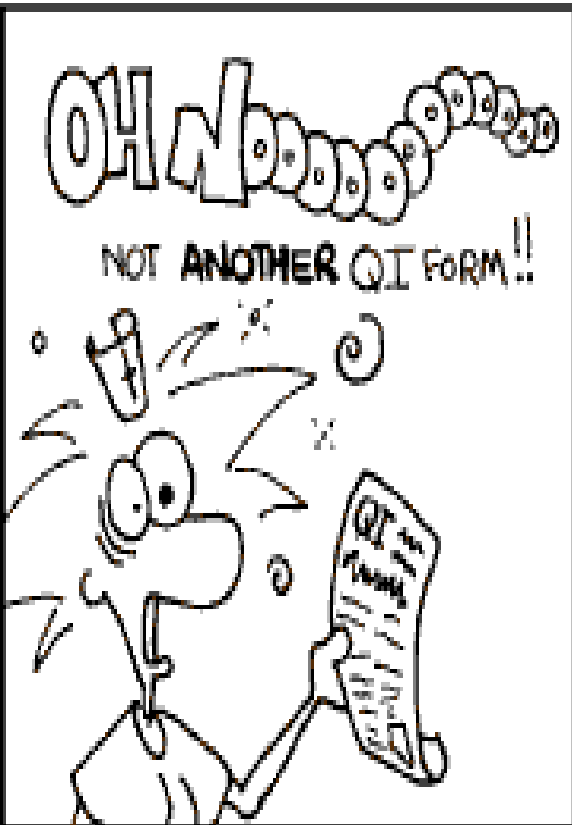


INFECTION PREVENTION

- ▶ **Safe:** Patients should not be harmed by the care that is intended to help them.
 - ▶ **Effective:** Services based on scientific knowledge.
 - ▶ **Patient-Centered:** Care that is respectful and responsive.
 - ▶ **Timely:** Reducing wait times and harmful delays
 - ▶ **Efficient:** Avoiding waste of supplies, resources
 - ▶ **Equitable:** No variation because of patient characteristics.
- ▶ **Safe:** Patients should not acquire a SSI as the result of a surgical procedure
 - ▶ **Effective:** Femoral site should not be used for CL access; surgical prophylaxis appropriate and timely
 - ▶ **Patient-Centered:** Patients on transmission based precautions should not receive a lower standard of care
 - ▶ **Timely:** Antibiotics should be administered as ordered
 - ▶ **Efficient:** Appropriate use of PPE; identification and disposal of regulated medical waste; antibiotic stewardship
 - ▶ **Equitable:** Foley catheters should not be placed solely due to patient incontinence

Nurstoons

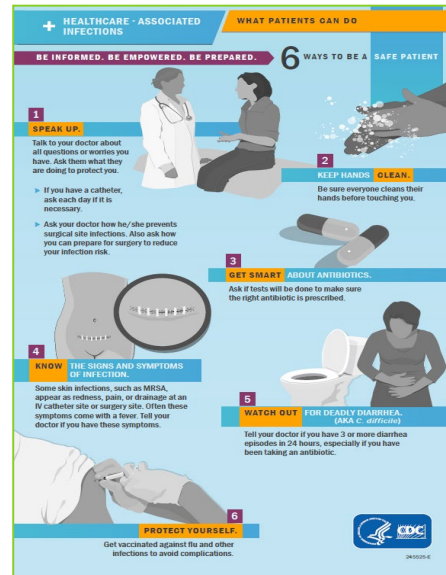
by Carl Elbing



www.nurtoon.com

PATIENT, FAMILY AND CAREGIVER INFECTION PREVENTION EDUCATION

- ▶ Include information about . . .
 - ▶ How infections spread
 - ▶ How they can be prevented
 - ▶ What signs or symptoms should prompt reevaluation and notification of the patient's healthcare provider
- ▶ Instructional materials and delivery should address varied levels of education, language comprehension, and cultural diversity
- ▶ Provide education to patients, family members, visitors, and their caregivers



https://apic.org/Resource_TinyMceFileManager/IP_and_You/IPandYou_In_fographicPoster_2013.pdf

https://www.cdc.gov/drugresistance/pdf/HAI-Patient-Empowerment_DPK.PDF

KEY ELEMENTS – EMPLOYEE HEALTH

Immunize

Immunize against vaccine-preventable diseases

- Hepatitis B
- Influenza
- MMR
- Varicella
- Tetanus, diphtheria, pertussis

Establish

Establish sick leave policies that encourage:

- Healthcare personnel to stay home when they are ill
- Reporting of signs, symptoms, and diagnosed illnesses that may represent a risk to their patients and coworkers

Adhere

Adhere to federal and state standards and directives applicable to protecting healthcare workers against transmission of infectious agents



INFECTION PREVENTION RISK ASSESSMENT

INFECTION CONTROL RISK ASSESSMENT IS ESSENTIAL TO INFECTION CONTROL PLAN

**Infection Control
Risk Assessment**

```
graph TD; A[Infection Control Risk Assessment] --> B[Priorities]; B --> C[Goals]; C --> D[Infection Control Plan];
```

The diagram consists of four horizontal bars arranged in a descending staircase pattern from top-left to bottom-right. Each bar is connected to the one below it by a red arrow pointing downwards. The bars are: 1. Dark blue bar with white text 'Infection Control Risk Assessment'. 2. Green bar with white text 'Priorities'. 3. Red bar with white text 'Goals'. 4. Light green bar with black text 'Infection Control Plan'.

Priorities

Goals

Infection Control Plan

RISK ASSESSMENT TIPS

- ▶ Proactive....prioritize risk or events that can cause harm
- ▶ No less than annual and/or revised during year as needed
- ▶ Multi-disciplinary approach
- ▶ Very subjective-no specific tool required
- ▶ Helps anticipate potentially preventable events and evaluate population served
 - Flu outbreak, hurricane (water/power loss), high number of oncology patients, use of central lines
- ▶ Use previous years data and regulatory requirements to begin
- ▶ Included in Infection Prevention Plan to assist with goal development



Living, breathing document

2 TYPES OF EVENTS/RISKS



▶ **Community/External**

- ▶ TB risk (HCP & patients)
- ▶ Geographical area & environmental issues such as flooding, hurricane, tornado, legionella, etc.
- ▶ Population served & socioeconomic status such as rural, low income, drug abuse, etc.

▶ **Facility specific/Internal**

- ▶ Healthcare-associated infections
- ▶ Antibiotic stewardship/ MDROs
- ▶ Exposure related events
- ▶ HCP compliance
- ▶ New services/construction
- ▶ Procedures/devices

DETERMINE YOUR EVENTS

EVENT	PROBABILITY OF OCCURRENCE <i>(How likely is this to occur)</i>				RISK LEVEL OF FAILURE <i>(What would be the most likely)</i>				POTENTIAL CHANGE IN CARE <i>(Will treatment/care be needed for resident/staff)</i>				PREPAREDNESS <i>(Are processes in place and can they work)</i>			YEAR: _____
	High	Med	Low	None	Life Threatening	Permanent Harm	Temp Harm	None	High	Med	Low	None	Poor	Fair	Good	RISK LEVEL Add rankings (score of 8 or > are considered highest priority for improvement efforts)
Score	3	2	1	0	3	2	1	0	3	2	1	0	3	2	1	
<i>Example: Lack of Communication with Transferring Facility</i>		2					1			2					1	6

Scoring Each Event/Risk

- ▶ **Probability-** *How likely is it to happen/occur?*
- ▶ **Risk Level-** *What degree of harm could occur; potential impact?*
- ▶ **Change Needed-** *Will treatment be needed for patient/staff?*
- ▶ **Preparedness-** *Are control measures in place, policies written, staff educated?*

Final Risk Level

- ▶ Determine by adding score from each category (some tools multiply)
- ▶ Rank by top 3-5 highest scores to determine priorities and goals

EVENT	PROBABILITY OF OCCURRENCE <i>(How likely is this to occur)</i>				RISK LEVEL OF FAILURE <i>(What would be the most likely)</i>				POTENTIAL CHANGE IN CARE <i>(Will treatment/care be needed for resident/staff)</i>				PREPAREDNESS <i>(Are processes in place and can they work)</i>			YEAR: _____
	High	Med	Low	None	Life Threatening	Permanent Harm	Temp Harm	None	High	Med	Low	None	Poor	Fair	Good	RISK LEVEL Add rankings (score of 8 or > are considered highest priority for improvement efforts)
Score	3	2	1	0	3	2	1	0	3	2	1	0	3	2	1	
Facility Associated Infection(s)																
Symptomatic Urinary Tract Infection (SUTI)		2			3				3					2		10


Important: Review year-end data from previous year!

- ▶ 6 UTIs in 2017 per NHSN Criteria compared to 12 in 2016
- ▶ 1 healthcare acquired C. difficile in 2017 compared to 2 in 2016
- ▶ 2 needle stick exposures in 2017 compared to 5 in 2016



EVENT	PROBABILITY OF OCCURRENCE <i>(How likely is this to occur)</i>				RISK LEVEL OF FAILURE <i>(What would be the most likely)</i>				POTENTIAL CHANGE IN CARE <i>(Will treatment/care be needed for resident/staff)</i>				PREPAREDNESS <i>(Are processes in place and can they work)</i>			YEAR: _____
	High	Med	Low	None	Life Threatening	Permanent Harm	Temp Harm	None	High	Med	Low	None	Poor	Fair	Good	RISK LEVEL Add rankings (score of 8 or > are considered highest priority for improvement efforts)
Score	3	2	1	0	3	2	1	0	3	2	1	0	3	2	1	
Healthcare personnel																
Lack of compliance with influenza immunization	3				3					2			3			11

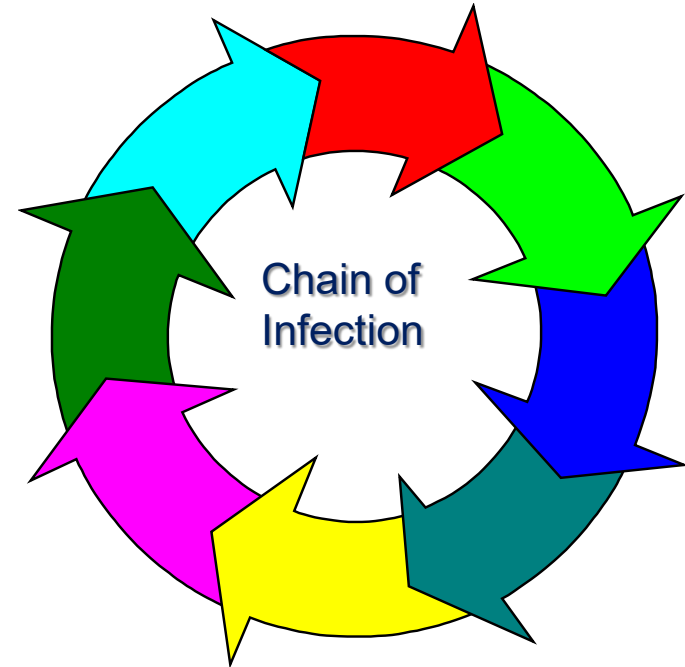
What are your opportunities?

- Staff Hand Hygiene compliance: 96% in 2017 (Goal = 90%)
- Employee influenza vaccination compliance: 40 % in 2017 

SURVEILLANCE PLAN

ELEMENTS REQUIRED FOR AN INFECTION

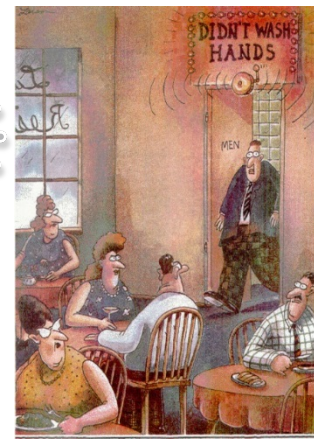
- Chain of Infection:
 - Infectious agent
 - Reservoir
 - Portal of Exit
 - Portal of Entry
 - Means of Transmission
 - Susceptible host
- All of these factors are present in healthcare settings



KEY CONCEPTS

- ▶ Surveillance is an essential component of an effective infection prevention program.
 - ▶ Should be based on sound epidemiological and statistical principles
 - ▶ Should be designed in accordance with current recommended practices and consist of defined elements
 - ▶ Plays a critical role in identifying outbreaks, emerging infectious disease and bioterrorist events

DEFINITIONS

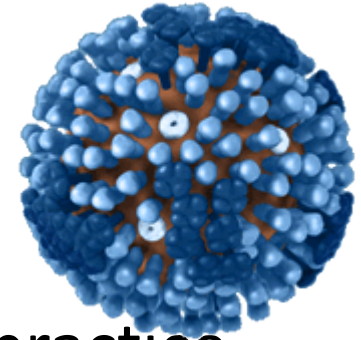


- ▶ Continual observation of a person or group, especially one suspected of doing something illegal (Bing Dictionary)
- ▶ Is the monitoring of the **behavior**, activities, or other changing information, usually of people for the purpose of influencing, managing, directing, or protecting. (Wikipedia)



“Local IP”

DEFINITIONS CONT'D



- **Disease surveillance** is an epidemiologic practice by which the spread of disease, is monitored in order to establish patterns of progression. **The main role of disease surveillance is to predict, observe, and minimize the harm caused by outbreak, epidemic, and pandemic situations, as well as increase knowledge about which factors contribute to such circumstances.** A key part of modern disease surveillance is the practice of **disease case reporting.**



DEFINITION CONT'D

- “Surveillance is a comprehensive method of measuring **outcomes** and related **processes** of care, analyzing the data, and providing information to members of the healthcare team to assist in improving those outcomes and processes”



RATIONAL FOR CONDUCTING SURVEILLANCE

- Determine baseline (endemic)
- Early detection of epidemics (adverse outcomes)
- Assess the effectiveness of prevention and control measures
- Monitor the occurrence of adverse outcomes to identify risk factors
- Observe practices to promote compliance
- Target performance improvement
- Compliance with regulations and accrediting agencies (including health department)
- Monitor bioterrorism events
- Provide information for the education of healthcare personnel

NATIONAL HEALTHCARE SAFETY NETWORK (NHSN)

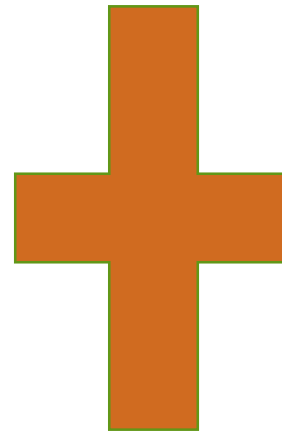
- ▶ NHSN is an internet-based surveillance system that integrates the surveillance systems previously managed separately in the Division of Healthcare Quality Promotion (DHQP) at CDC
 - ▶ National Nosocomial Infections Surveillance (NNIS) system
 - ▶ Dialysis Surveillance Network (DSN)
 - ▶ National Surveillance System for Healthcare Workers (NaSH)



PURPOSE OF NHSN

Original

- ▶ Collect data from a sample of US healthcare facilities
- ▶ Analyze and report collected data to permit recognition of trends
- ▶ Provide facilities with risk-adjusted data
- ▶ Assist facilities in developing systems to recognize safety problems and intervene
- ▶ Conduct collaborative research



Ongoing

- ▶ Data repository for CMS and State mandates for reporting of healthcare associated infections

NHSN Components

Patient Safety

Device-associated module
Procedure-associated
module
Antimicrobial Use and
Resistance Module
MDRO/CDI Module

HCP Safety OP Dialysis

BBF Exposure
Influenza Vaccination

LTCF Biovigilance

LabID
UTI
Prevention
Process
Measures



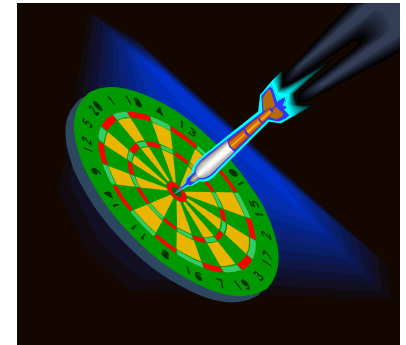
THE ESSENTIALS OF SURVEILLANCE

- ▶ Know the protocol/criteria
- ▶ Consistently apply the criteria
- ▶ Report events meeting criteria; exclude those that don't
- ▶ Failure to do so:
 - ▶ Breach of NHSN Rules of Behavior
 - ▶ Decreased usefulness of national comparative data
 - ▶ Unfair comparisons between facilities
 - ▶ Possible validation discrepancies
 - ▶ Potential impact of CMS Inpatient quality Reporting score and facility reimbursement
- ▶ Concerns about the criteria should be sent to NHSN-NOT addressed by non-reporting of events or facility adjudication

The Basics of NHSN Patient Safety Component Surveillance and Updates for 2017: Kathy Allen-Bridson

TYPES OF SURVEILLANCE

- Total (or Whole) House Surveillance
 - All HAIs are monitored in the entire population
 - Calculate rates for specific population (not an overall facility wide rate)
- Targeted Surveillance
 - Particular care units
 - Infections related to medical devices
 - Organisms of epidemiological importance
- Combination Surveillance Strategy
 - Most use a combination and monitor targeted events that occur in defined populations while concurrently monitoring select HAIs and laboratory reports from house-wide locations



SURVEILLANCE METHODS

- ▶ *Results with MS versus ES (HAIs in ICU) were:
 - ▶ Sensitivity 40% vs 87%
 - ▶ Specificity 94% vs 99%

**Effectiveness of an automated surveillance system for intensive care unit-acquired infections: Vienna , Austria; 2006-2007*

APIC POSITION PAPER: THE IMPORTANCE OF SURVEILLANCE TECHNOLOGIES IN THE PREVENTION OF HEALTHCARE-ASSOCIATED INFECTIONS (HAIS)

- Streamline and facilitate efficient review of relevant data, promoting rapid identification of sentinel events and detection of outbreaks
- Expand and better define the scope of infection prevention activities
- Reduce infection prevention department time spent on surveillance and clerical tasks
- Improve response to public health issues
- Regulatory compliance
- Financial performance
- Potential to enhance antibiotic stewardship programs





[Chapter 1: National Healthcare Safety Network \(NHSN\) Overview](#)

[Chapter 2: Identifying Healthcare-associated Infections \(HAI\) for NHSN Surveillance](#)

[Chapter 3: Patient Safety Monthly Reporting Plan and Annual Surveys](#)

[Chapter 4: Bloodstream Infection Event \(Central Line-Associated Bloodstream Infection and non-central line-associated Bloodstream Infection\)](#)

[Chapter 5: Central Line Insertion Practices \(CLIP\) Adherence Monitoring](#)

[Chapter 6: Pneumonia \(Ventilator-associated \[VAP\] and non-ventilator-associated Pneumonia \[PNEU\]\) Event](#)

[Chapter 7: Urinary Tract Infection \(Catheter-Associated Urinary Tract Infection \[CAUTI\] and non-catheter-associated Urinary Tract Infection \[UTI\]\) and Other Urinary System Infection \(USI\) Events](#)

[Chapter 9: Surgical Site Infection \(SSI\) Event](#)

[Chapter 10: Ventilator-Associated Event \(VAE\)](#)

[Chapter 11: Pediatric Ventilator-Associated Event \(pedVAE\)](#)

[Chapter 12: Multidrug-Resistant Organism & *Clostridium difficile* Infection \(MDRO/CDI\) Module](#)

[Chapter 15: CDC Locations and Descriptions and Instructions for Mapping Patient Care Locations](#)

[Chapter 16: General Key terms](#)

STANDARDIZED DEFINITIONS

KEY TERMS



	SSI*	LabID*	VAE*	PedVAE*
Infection Window Period	Not Applicable	Not Applicable	Not Applicable	Not Applicable
Date of Event				
POA				
HAI				
Repeat Infection Time Period				
Secondary BSI Attribution Period				

*See SSI, LabID, VAE and PedVAE surveillance protocols

KEY TERMS



➤ *NHSN Infection Window Period:*

Defined as the 7-days during which all site-specific infection criteria must be met. It includes the **collection** date of the first positive diagnostic test that is used as an element to meet the site-specific infection criterion, the 3 calendar days before and the 3 calendar days after.

For site-specific infection criteria that do not include a diagnostic test, the first documented localized sign or symptom that is an element of NHSN infection criterion should be use define the window

Infection Window Period		3 days before
	<i>Date of the first positive diagnostic test that is used as an element of the site-specific criterion OR date of first documented localized sign or symptom</i>	
		3 days after

KEY TERMS



- *Date of Event (DOE)*
 - The date the **first** element used to meet an NHSN site-specific infection criterion occurs for the **first** time within the seven-day infection window period

Note: The element MAY have been present before the infection window period

KEY TERMS



► *Present on Admission (POA)*

- When the date of “event” occurs during the POA time period.
- Defined as the day of admission to an inpatient location (calendar day 1), the 2 days before admission, and the calendar day after admission.

Hospital Day	Date of Event	Classification
2 days before admit	Hospital Day 1	POA
1 day before admit	Hospital Day 1	
Admission (Day 1)	Hospital Day 1	
Day 2	Hospital Day 2	
Day 3	Hospital Day 3	HAI
Day 4	Hospital Day 4	
Day 5	Hospital Day 5	

PRESENT ON ADMISSION CONT'



- *Acceptable documentation:*
 - **Patient-reported signs or symptoms** documented in the medical record by a healthcare professional (must be in your facility medical record documentation).
 - Physician diagnosis can be accepted **only** when physician diagnosis is an element of the specific infection criteria
- Infections in newborns with date of event on hospital day 1 or day 2 are considered POA. Day 3 or after are HAIs, includes acquired transplacentally (for example but not limited to: herpes simplex, toxoplasmosis, rubella, cytomegalovirus, or syphilis) or as a result from passage through the birth canal.

KEY TERMS



➤ *Healthcare-associated Infection (HAI)*

The date of event occurs on or after the 3rd calendar day of admission to an inpatient location where day of admission is calendar day1

Hospital Day	Date of Event	Classification
2 days before admit	Hospital Day 1	POA
1 day before admit	Hospital Day 1	
1	Hospital Day 1	
2	Hospital Day 2	HAI
3	Hospital Day 3	
4	Hospital Day 4	
5	Hospital Day 5	

KEY TERMS



➤ *Repeat Infection Timeframe (RIT)*

- A 14-day timeframe during which no new infections of the same type are reported.
- The date of event is Day 1 of the 14 day RIT.
- Additional pathogens recovered during the RIT from the same type of infection are added to the event.
- Applies during a patient's single admission including the day of discharge and the day after.
- May have negative cultures during RIT
- Do not change device-association determination during RIT

SUTI identified, foley placed and while still in RIT meets definition for CAUTI. Add pathogen to initial event and do not change the SUTI to CAUTI

KEY TERMS



- *Secondary BSI Attribution Period (SBAP):*
 - Is the period in which a positive blood culture must be collected to be considered as a secondary bloodstream infection to a primary site infection
 - This period includes the **Infection Window Period** combined with the **Repeat Infection Timeframe (RIT)**. It is 14-17 days in length depending upon the date of event.
 - For SSI surveillance a 17 day period that includes the date of SSI event 3 days prior and 13 days after, is still used to attribute a BSI as secondary to an SSI

Hospital Day	BSI	RIT	Infection Window	Infection Window	RIT					
1										
2										
3										
4								Fever > 38.0 C	DOE	
5								Urine culture >100,000 cfu/ml <i>K. pneumonia</i>		
6										
7										
8										
9										
10								Blood Culture; <i>K. pneumonia</i> /Yeast	Blood Culture: <i>K. pneumonia</i> /Yeast	
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22			UTI & Secondary BSI with <i>K. pneumonia</i>	Primary BSI with <i>Yeast</i>						
23										
24										



KEY TERMS



▶ *Location of Attribution (LOA)*

- ▶ The inpatient location where the patient was assigned on the day of event is the LOA. Non-bedded patient locations (OR, IR) not eligible.

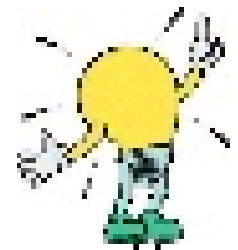
▶ *Transfer Rule:*

- ▶ If the date of event (**not all elements**) is on the date of transfer or discharge or the next day, the infection is attributed to the transferring, discharge location.

▶ *Vital Signs:*

- ▶ For fever use the temperature documented in the patient's medical record.
- ▶ If a specific value for a vital sign is not stated in a CDC/NHSN HAI definition criterion, (hypotension) the facility should use the vital sign parameters as stated in its policies and procedures for clinical practices.

TIDBITS OF INTEREST

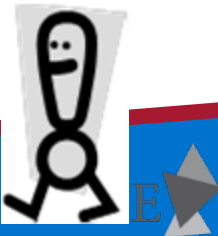


- Additional pathogens recovered during the RIT from the same type of infection are added to the event
 - *Example: SUTI with E. coli; during RIT SUTI with S. aureus; add S. aureus to initial event*
- BSI pathogens may be assigned to more than one infection source at the same time
 - *Example: SUTI and IAB*
- In instances where a patient has been transferred to more than one location on the date of an infection, or the day before, attribute the infection to the first location in which the patient was housed the day before the infection's date of event
 - *Example: 3/22: Unit A 3/23: Unit A, Unit B, Unit C 3/24: Unit C, Unit D (Definition of CAUTI met). Assign to Unit A*

CLINICAL DISAGREEMENT?

	Surveillance Definitions	Clinical Diagnosis
Purpose	Identify trends <u>within a population</u> for prevention	Identify disease in, and treatment for, <u>individual patients</u>
Components	Limited predetermined data elements	All diagnostic information available
Clinical Judgment	Excluded if possible	Valued

Bottom Line: At times clinical judgment and surveillance determinations will not match. Surveillance determinations always “trump” in epidemiologic surveillance



COLLECTING SURVEILLANCE DATA

- Train personnel in data collection methods
- Develop a data collection form to fit the surveillance objective
- Determine the appropriate approach to surveillance concurrent (prospective) and/or retrospective
- Incorporate post-discharge surveillance for certain outcomes
- Collect data from a variety of sources (communication with caregivers)
- Be aware that passively obtained data may be biased

ORGANIZATION-SPECIFIC SOURCES OF POPULATION INFORMATION

- Medical records
- Financial services
- Quality/utilization management
- Surgical database
- Administrative/management reports
- Risk management
- Public health reports
- Community agencies
- Occupational Health
- Human resources records



APPLYING RISK STRATIFICATION METHODOLOGY

- ▶ Foster understanding and acceptance by recipients of the data
 - ▶ Explain how the data has been stratified by risk
- ▶ Allows comparisons to be made
- ▶ Facilitate validity of interventions



NHSN 2006-2008 SUMMARY: CLABSI IN LEVEL III NICUS

Central line-associated BSI rate

<u>Birth Weight</u>	<u>Central line days</u>	<u>No. of CLABSI</u>	<u>Pooled Mean</u>
≤750 g	122,272	481	3.9
751-1000 g	111,293	373	3.4
1001-1500g	112,926	276	2.4
1501-2500g	90,384	216	2.4
>2500g	82,677	157	1.9

AJIC 2009;37:783-805

REPORTING AND USING SURVEILLANCE INFORMATION



- ▶ A plan for the distribution of surveillance information should be incorporated into the development of each surveillance component
- ▶ Surveillance (should) go to those health care providers who are most able to impact and improve patient care

VALIDATE SURVEILLANCE DATA

- ▶ “In the context of powerful inducements for facilities to “look good”, meaningful external validation is essential to assure that NHSN surveillance meets the requirements for which it was intended; that outcomes for reporting facilities are appropriate, that NHSN data are credible, and that the focus of NHSN surveillance will be better patient care.”

WHY WE SHOULD VALIDATE

- ▶ Study of 30 hospitals in Connecticut in 2008 validated reporting of CLABSI (mandatory reporting)
 - ▶ >50% under reporting of CLABSI
 - ▶ Reasons included:
 - ▶ Interpretation of primary vs secondary
 - ▶ Recognized pathogen vs skin contaminate
- ▶ In January 2012 Department of Public Health in Oregon published a review they had conducted for validation of CLABSI
 - ▶ Sensitivity of reporting 72%
 - ▶ Specificity of reporting 99%

NORTH CAROLINA VALIDATION STUDY

FOUR PHASES; 7/2009-6/2011

Sensitivity estimate (95% C.I.)

- ▶ CLABSI: 72.6% (69.2%, 75.9%)
- ▶ CAUTI: 73.8% (68.2%, 79.4%)

Specificity estimate (95% C.I.)

- ▶ CLABSI: 97.1% (96.5%, 97.7%)
- ▶ CAUTI: 91.4% (90.1%, 92.8%)

Unpublished data

NORTH CAROLINA VALIDATION STUDY

CONDUCTED IN 2015

Sensitivity estimate

- CLABSI: 79%
- C difficile: 53%

Specificity estimate

- CLABSI: 100%
- C difficile: 88%

Unpublished data

VALIDATION TOOLS FROM CDC

The screenshot shows a web browser window displaying the CDC website. The address bar shows the URL: www.cdc.gov/nhsn/toolkit/validation-clabsi/index.html. The page title is "NHSN Validation Guidance and Toolkit; Validation for 2012 Central Line-associated Bloodstream Infection (CLABSI) in ICUs".

The page features a navigation menu on the left with the following items:

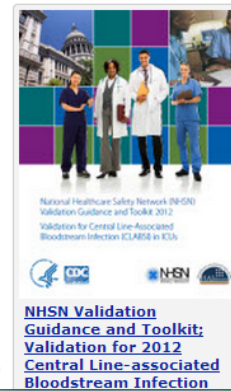
- NHSN
- About NHSN
- Enroll Here
- Materials for Enrolled Facilities
- Acute Care Hospitals/Facilities
 - Surveillance for Antimicrobial Use and Antimicrobial Resistance
 - Surveillance for CAUTI
 - Surveillance for *C. difficile* and MRSA Infections
 - Surveillance for CLABSI
 - Validation Guidance and Toolkit; Validation for 2012 CLABSI in ICUs**
 - Surveillance for CLIP Adherence
 - Surveillance for SSI Events
 - Surveillance for VAE
 - Surveillance for VAD

[NHSN](#) > [Materials for Enrolled Facilities](#) > [Acute Care Hospitals/Facilities](#)

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NHSN Validation Guidance and Toolkit; Validation for 2012 Central Line-associated Bloodstream Infection (CLABSI) in ICUs

- NHSN Validation Guidance and Toolkit; Validation for 2012 Central Line-associated Bloodstream Infection (CLABSI) in ICUs (Chapters 1–3) [PDF - 798 KB]
 - Appendix 1 Facility Self-validation Tool for CLABSI Surveillance [PDF - 96 KB]
 - Appendix 2 Template Denominator Collection Methods Survey for CLABSI Surveillance [PDF - 107 KB]
 - Appendix 3a External Validation; Targeted Facility Selection [PDF - 353 KB]
 - Appendix 3b External Validation; 5% Simple Random Sample of Facilities [PDF - 69 KB]
 - Appendix 3c External Validation; Medical Record Selection [PDF - 74 KB]
 - Appendix 4 Template Letter Requesting External Validation Site Visit [PDF - 67 KB]
 - Appendix 5 and 5a ICU CLABSI Medical Record Abstraction Tool and Tennessee Checklists for Validation [PDF - 55 KB]



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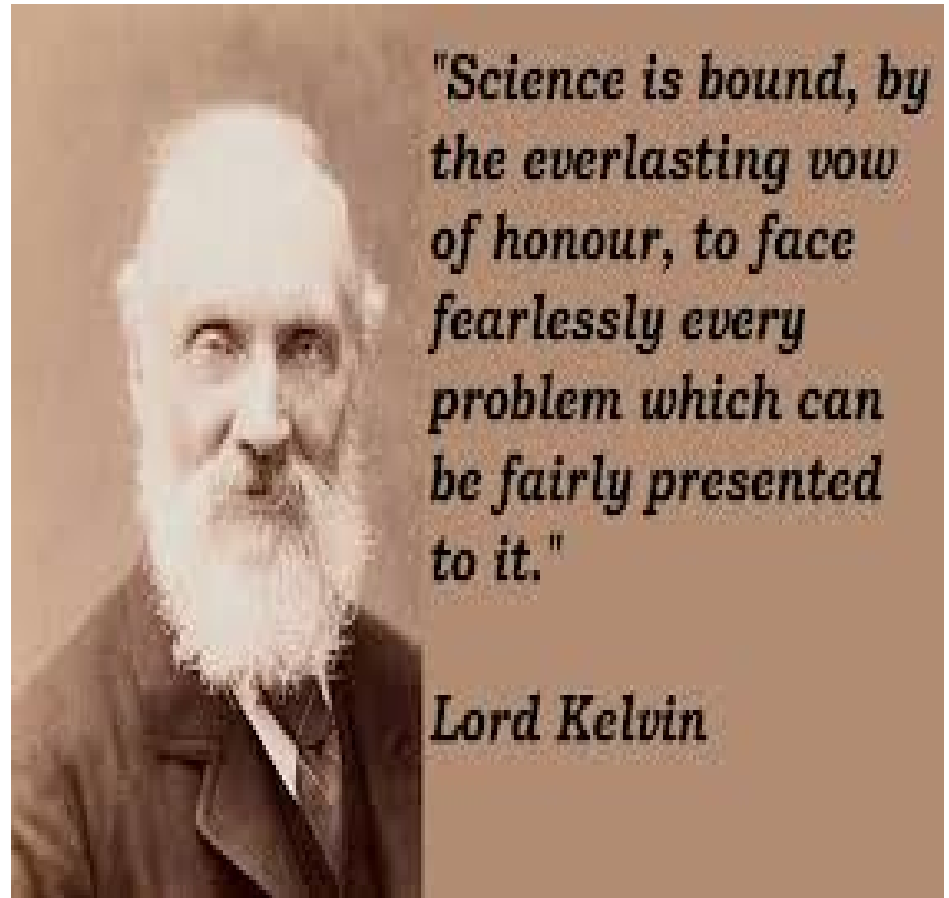
[What's this?](#)



8:17 PM
3/21/2013

“Good surveillance does not necessarily ensure the making of the right decision, but it reduces the chances of wrong ones.”

Alexander D.
Langmuir



Data: Analysis and Presentation

REFERENCES

- Infection prevention: General principles; UpToDate

<https://www.uptodate.com/contents/infection-prevention-general-principles>

- Healthcare-Associated Infection: Castlight/The LeapfrogGroup

- NHSN Patient Safety Manual: 2019

- CDC Current HAI Progress Report

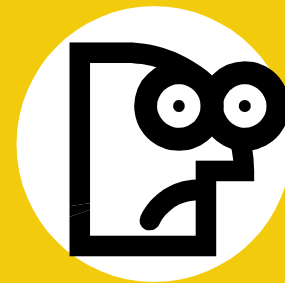
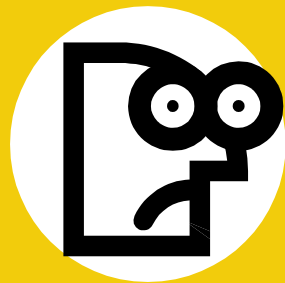
<https://www.cdc.gov/hai/data/portal/progress-report.html>

- Healthcare-Associated Infections in North Carolina: 2017

https://epi.publichealth.nc.gov/cd/hai/figures/2017/2017Q4_Hospital_Specific_Quarterly_Report.pdf

- Core Infection Prevention and Control Practices for Safe Healthcare Delivery in All Settings – Recommendations of the Healthcare Infection Control Practices Advisory Committee

<https://www.cdc.gov/hicpac/pdf/core-practices.pdf>



It's QUESTION TIME !!