DEVELOPMENT OF AN INFECTION CONTROL PROGRAM FOR ACUTE CARE FACILITIES

Evelyn Cook, RN, CIC

Associate Director

https://spice.unc.edu/
https://spice.unc.edu/ask-spice/

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]
- Two million acquire annually[2]
- 90,000 deaths[2]
- Cost range $1,000 to nearly $50,000[2]
- Hospitals spend $28 to $45 billion annually on HAI cost[3]

[1]CDC Progress Report
[2]The Leapfrog group
[3]Healthcare Finance

COVID-19 FINANCIAL COST

- Average cost of hospital care for COVID-19 patients without insurance or who received out-of-network care varies by age:
  - Under 20 years of age averaged $68,261
  - Over 60 years of age averaged $77,323
- Increased by length of stay
- Inpatient COVID-19 hospitalizations could cost U.S. healthcare system between $9.6 billion and $16.9 billion in 2020
  - Commercial, Medicare then Federal and State Medicaid

https://www.healthcarefinancenews.com/news/average-cost-hospital-care-covid-19-ranges-51000-78000-based-age

NC STATEWIDE
HEALTHCARE-ASSOCIATED INFECTIONS
(2019)

Metric	# Observed Infections	# Predicted infections	Compare to National Experience
CLABSI	499	533.062	Same
CAUTI	478	661.4	Better
Abd Hysterectomy (SSI)	65	98.36	Better
Colon (SSI)	304	320.3	Same
MRSA LabID	274	387.094	Better
C diff LabID	1898	3384.49	Better

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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
Clostridium difficile hospitalizations (HCUP)[3]	Data pending release	30% reduction

WHAT ABOUT SARS-CoV-2
(APRIL 8ᵀᴴ, 2021)

- Total Number of U.S. Cases
  - 30,662,171
- Total Number of U.S. Deaths
  - 555,231
- Total Vaccines Administered
  - 171 M

- Total Number of **N.C**. Cases
  - 924,810
- Total Number of N.C. Deaths
  - 12, 212
- Percent of population vaccinated:
  - Fully vaccinated: 20.8%
  - Partially vaccinated: 30.6%

North Carolina

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Cases of Variants of Concern in the United States*†   April 8th, 2021

Number of Cases

- 0 to 0
- 1 to 150
- 151 to 300
- 301 to 450
- 451 to 600
- 601 to 750
- 751+

Filters

Variant B.1.1.7

Territories AS GU MH FM MP PW PR VI
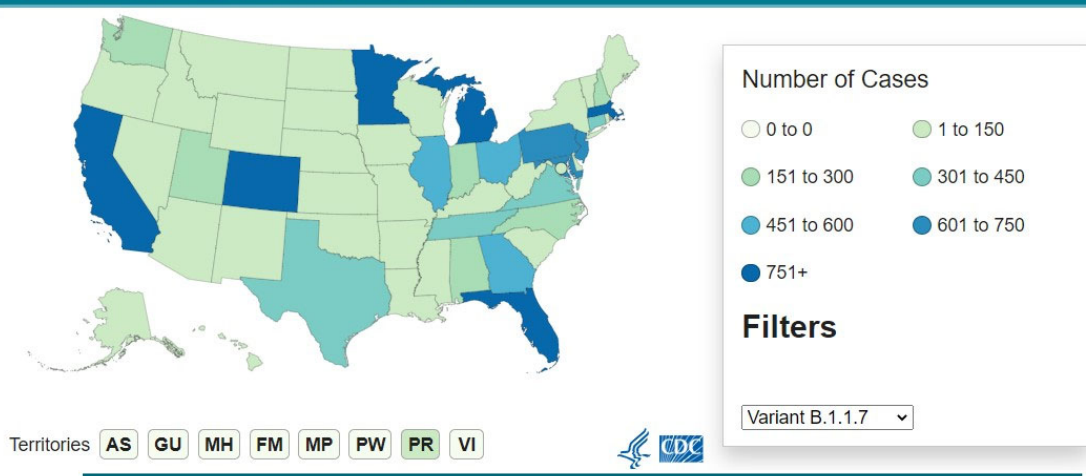
Variant	Reported Cases in US	Number of Jurisdictions Reporting
B.1.1.7	16,275	52
B.1.351	386	36
P.1	356	25

Cases of Variants of Concern in the United States*†

https://www.cdc.gov/coronavirus/2019-ncov/transmission/variant-cases.html

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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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> ▶ *"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 let to sizeable decreases in hospital-acquired infections"*

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EVOLUTION OF SURVEILLANCE PROGRAMS

▶ <u>1958</u>: AHA recommended in response to outbreaks of *Staphylococcus aureus* infections in hospitals.

▶ <u>1960's</u>: CDC recommended hospital base programs include surveillance

▶ <u>1976</u>: TJC first included infection surveillance, prevention and control standards in its accreditation manual

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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.

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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.

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HEALTHCARE FACILITY HAI REPORTING TO CMS VIA NHSN:

HAI Event	Facility Type	Start Date
Acute Care Hospitals		
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
C difficile 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

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March 29, 2020 COVID-19
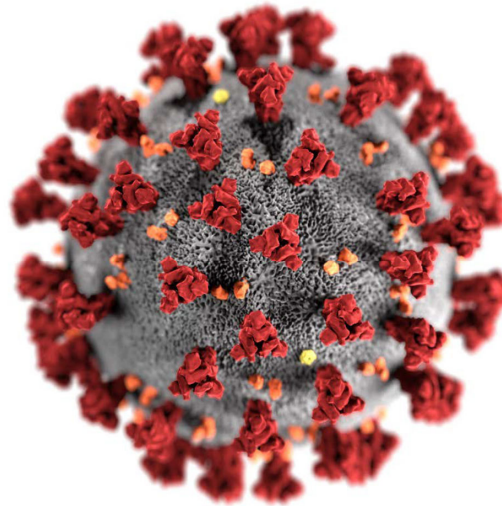
EVOLUTION OF TERMINOLOGY

Program Terminology

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

Staffing Terminology

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

PREVENTION WORKS!

EVOLUTION OF THE PROFESSION

▶ APIC founded in 1972 by a small group of infection control nurses

▶ Now serves >15,000 members across 48 countries

▶ IOM report "To Err is Human"-shed light on healthcare associated adverse events, including infections

▶ CMS mandatory reporting regulations

▶ Movement from targeted (CLABSIs in ICUs) to total house (CLABSIs all locations) surveillance

▶ Expansion of role outside the hospital (clinics, LTCFs etc.,)

A systematic approach to quantifying infection prevention staffing and coverage needs; R. Bartles et al. / American Journal of Infection Control 46 (2018) 487-91

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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

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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

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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

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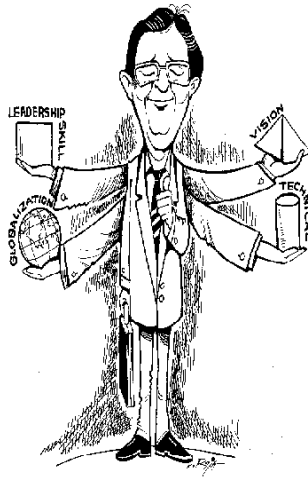
- ▶ Implementation of mandated changes
- ▶ Application of epidemiologic principles-*outbreak management*
- ▶ Antimicrobial management
- ▶ Research
- ▶ High quality services in a cost-efficient manner

STAFFING

▶ The way in which IPs spend their "time varies significantly from hospital to hospital and is driven in part by regulations, by the priorities of hospital administration and supervisors of IP, and by the strengths and interests of the IP," according to the study.

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

QUANTITATIVE NEEDS ASSESSMENT

- Conducted a quantitative needs assessment care settings:
  - Inpatient, Long-term care, ambulatory, rehab, home care
- Assessed activities pertinent to the setting:
  - Inpatient and LTCF
    - Activity, times per year conducted, hours required per each activity, total number of units or areas included and hours per week
  - Ambulatory:
    - Clinic name, # of rooms, HLD, sterilization, endoscope, TB, Surgery, Pt visits per month, IP travel time, visits per year, hours per visit, hours per week

Setting	Activity	Times per year	Hours per each activity	Total no. of units	Hours per week
Inpatient units and step-downs	Isolation-rounding to influence	260	0.25	15	18.75

FINDINGS

▶ The IPC FTE needs of the system as a whole were <u>underrepresented</u> by 66% when using the lower staffing ratio benchmark of 0.5 FTE per 100 beds- *37.435 versus actual 108.40*

▶ By 31% when using the higher staffing ratio benchmark of 1.0 FTE per 100 beds- *74.82 versus actual 108.40*

▶ When aggregated across the organization, the comprehensive review results yielded a new benchmark of **1.0 IPC FTE per 69 beds** for the enterprise, including all care settings requiring IPC oversight.

A systematic approach to quantifying infection prevention staffing and coverage needs; R. Bartles et al. / American Journal of Infection Control 46 (2018) 487-91

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 | Audits | Feedback

COMPETENCY

T A P
TARGET ASSESS PREVENT

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.
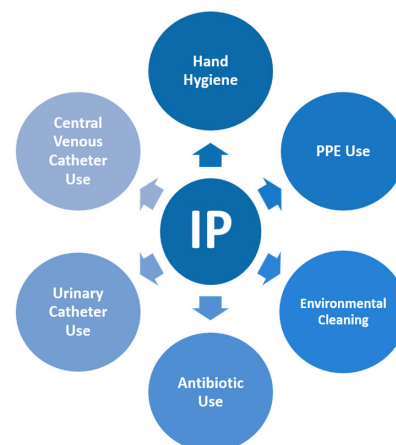
Competency-Based Training Tools

- ▶ 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

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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

IP
- Hand Hygiene
- PPE Use
- Environmental Cleaning
- Antibiotic Use
- Urinary Catheter Use
- Central Venous Catheter Use

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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

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WHAT IS HEALTH CARE QUALITY?

▶ Everyone has his/her definition of high-quality health care

  ▶ Go to their doctor of choice

  ▶ Receive any care they believe they need

Hemodialysis machine

  ▶ Go to the hospital and not get an infection or suffer from some injury as a result of care
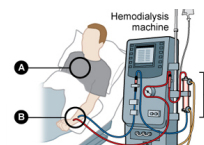
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WHAT IS HEALTH CARE QUALITY?

▶ 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 <u>not acceptable for patients to be harmed</u> 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 <u>healthcare that we now have and the healthcare that we could have lies not just a gap but a chasm</u>

▶ 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". *<u>The committee concluded that most people will experience at least one diagnostic error in their lifetime, sometimes with devastating consequences</u>*

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

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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
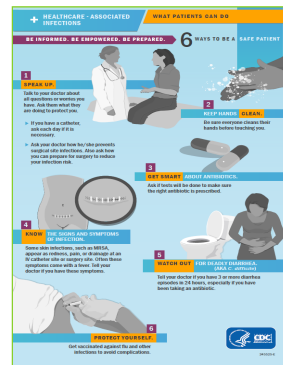
https://apic.org/Resource_/TinyMceFileManager/IP_and_You/IPandYou_InfographicPoster_2013.pdf

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

KEY ELEMENTS – EMPLOYEE HEALTH

Immunize	Establish	Adhere
Immunize against vaccine-preventable diseases • Hepatitis B • Influenza • MMR • Varicella • Tetanus, diphtheria, pertussis • COVID-19	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 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

Priorities

Goals

Infection Control Plan

Infection Prevention and Control Assessment Tool for Acute Care Hospitals

This tool is intended to assist in the assessment of infection control programs and practices in acute care hospitals. If feasible, direct observations of infection control practices are encouraged. To facilitate the assessment, health departments are encouraged to share this tool with hospitals in advance of their visit.

Overview

Section 1: Facility Demographics

Section 2: Infection Control Program and Infrastructure

Section 3: Direct Observation of Facility Practices (optional)

Section 4: Infection Control Guidelines and Other Resources

Infection Control Domains for Gap Assessment

I. Infection Control Program and Infrastructure

II. Infection Control Training, Competency, and Implementation of Policies and Practices

    A. Hand Hygiene

    B. Personal Protective Equipment (PPE)

    C. Prevention of Catheter-associated Urinary Tract Infection (CAUTI)

    D. Prevention of Central Line-associated Bloodstream Infection (CLABSI)

    E. Prevention of Ventilator-associated Event (VAE)

    F. Injection Safety

    G. Prevention of Surgical Site Infection

    H. Prevention of *Clostridium difficile* Infection (CDI)

    I. Environmental Cleaning

    J. Device Reprocessing

III. Systems to Detect, Prevent, and Respond to Healthcare-Associated Infections and Multidrug-Resistant Organisms (MDROs)

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Section 2: Infection Control Program and Infrastructure

I. Infection Control Program and Infrastructure		
Elements to be assessed	**Assessment**	**Notes/Areas for Improvement**
1. Hospital provides fiscal and human resource support for maintaining the infection prevention and control program.	○ Yes ○ No	
2. The person(s) charged with directing the infection prevention and control program at the hospital is/are qualified and trained in infection control. Verify qualifications, which should include: (Check all that apply) ☐ Successful completion of initial and recertification exams developed by the Certification Board for Infection Control & Epidemiology (CIC) AND/OR ☐ Participation in infection control courses organized by recognized professional societies (e.g., APIC, SHEA)	○ Yes ○ No	
3. Infection prevention and control program performs an annual facility infection risk assessment that evaluates and prioritizes potential risks for infections, contamination, and exposures and the program's preparedness to eliminate or mitigate such risks. *Note: Example of Facility Infection Risk Assessment Report and Plan is available in Section 4.*	○ Yes ○ No	
4. Written infection control policies and procedures are available, current, and based on evidence-based guidelines (e.g., CDC/HICPAC), regulations, or standards. Verify the following: a. Respondent can describe the process for reviewing and updating policies (e.g., policies are dated and reviewed annually and when new guidelines are issued)	○ Yes ○ No a. ○ Yes ○ No	
5. Infection prevention and control program provides infection prevention education to patients, family members, and other caregivers. Verify the following: a. Respondent can describe how this education is provided (e.g., information included in the admission or discharge packet, videos, signage, in-person training)	○ Yes ○ No a. ○ Yes ○ No	

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DETERMINE YOUR EVENTS

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

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	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 2019 (Goal = 90%)

- Employee influenza vaccination compliance: 40 % in 2019 (Goal 75%)

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Facility Related	Likelihood	Severity	Preparedness	Risk Score
	1(low)-5(high)	1(low)-5(high)	1(low)-5(high)	(Likelihood X Severity)/ Preparedness
Influenza like illness				
Symptomatic UTI	5	5	1	25
Cellulitis/SST Infection				
C difficile				

Example:

Symptomatic UTI:

➢ **10** symptomatic UTIs were documented to meet surveillance criteria and reported as HAIs in **2019**
➢ **30** symptomatic UTIs were documented to meet surveillance criteria and reported as HAIs in **2020**

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COMPREHENSIVE HOSPITAL PREPAREDNESS CHECKLIST FOR CORONAVIRUS DISEASE 2019
(COVID-19)

All U.S. hospitals should be prepared for the possible arrival of patients with COVID-19. All hospitals should ensure their staff are trained, equipped and capable of practices needed to: (1) Prevent the spread of COVID-19 within the facility; (2) Promptly identify and isolate patients with possible COVID-19 and inform the correct facility staff and public health authorities; (3) Care for a limited number of patients with confirmed or suspected COVID-19 as part of routine operations; (4) Potentially care for a larger number of patients in the context of an escalating outbreak while maintaining adequate care for other patients; (5) Monitor and manage any healthcare personnel that might be exposed to COVID-19; and (6) Communicate effectively within the facility and plan for appropriate external communication related to COVID-19.

https://www.cdc.gov/coronavirus/2019-ncov/hcp/hcp-hospital-checklist.html

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3. Elements of a COVID-19 plan

General:

Item	Completed	In Progress	Not Started
A plan is in place for protecting patients, healthcare personnel, and visitors from COVID-19, that addresses the elements that follow.	☐	☐	☐
A person has been assigned responsibility for monitoring public health advisories (federal and state) and updating the COVID-19 response coordinator and members of the COVID-19 planning committee when COVID-19 is in the geographic area. This person should also monitor developments that might result in staff not being able to report to work, such as school closures. For more information, see https://www.cdc.gov/coronavirus/2019-ncov/index.html. (Insert name, title and contact information of person responsible.) Primary (Name, Title, Contact Information): Backup (Name, Title, Contact Information):	☐	☐	☐
A written protocol has been developed for identifying, monitoring and reporting COVID-19 among hospitalized patients, volunteers, and staff (e.g., weekly or daily number of patients and staff with COVID-19).	☐	☐	☐
A plan to monitor and track COVID-19 related staff absences has been developed.	☐	☐	☐
A protocol has been developed for the evaluation and diagnosis of hospitalized patients, volunteers, and staff with symptoms of COVID-19. Information on the clinical signs and diagnosis of COVID-19 is available at https://www.cdc.gov/coronavirus/2019-ncov/hcp/clinical-guidance-management-patients.html.	☐	☐	☐
A protocol has been developed for the management of persons with possible COVID-19 who are contacted and evaluated using telehealth or telemedicine methods, in the emergency department, hospital clinics, or are transferred from another facility or referred for hospitalization by an admitting physician. The protocol includes criteria for detecting a possible case, the diagnostic work-up to be performed, infection control measures to be implemented, supportive medical treatment, and directions for notifying public health and infection control.	☐	☐	☐
A system is in place to monitor for and internally review healthcare-associated transmission of COVID-19 among patients and staff in the facility. Information used from this monitoring system is used to implement prevention interventions (e.g., isolation, cohorting).	☐	☐	☐

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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

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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

▶ 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
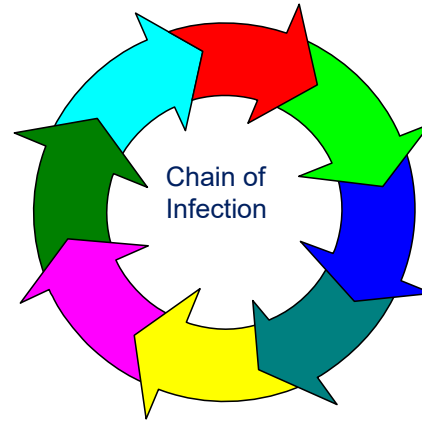
Living, breathing document

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SURVEILLANCE PLAN

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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 all healthcare settings

Chain of Infection

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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
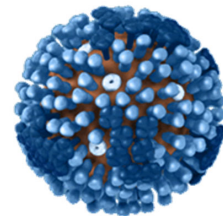

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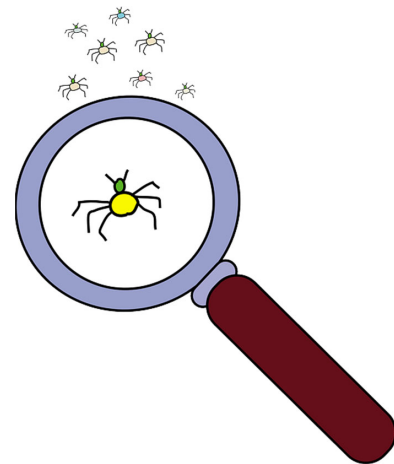
DEFINITIONS
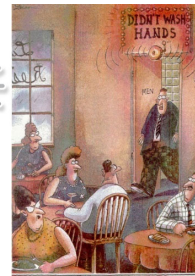
▶ Continual observation of a person or group, especially one suspected of doing something illegal (Bing Dictionary)

▶ 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"

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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**.

Health Department

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DEFINITION CONT'D

➢ "Surveillance is a comprehensive method of <u>measuring</u> outcomes and related processes of care, <u>analyzing</u> the data, and <u>providing</u> <u>information</u> to members of the healthcare team to assist in improving those outcomes and processes"

Recommended Practices for Surveillance

Assess → Select outcome or process → Use Surveillance definitions → Collect data → Analyze → Risk Stratify → Report → Validate → Assess

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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

APIC Text 2015

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TYPES OF SURVEILLANCE

- Total (or Whole) House Surveillance
- Targeted Surveillance
- Combination Surveillance Strategy

TOTAL (WHOLE HOUSE)

▶ Monitor:
  - ▶ All infections
  - ▶ Entire population
  - ▶ All units

Pros	Cons
Monitor all infections	Overall rate not sensitive or risk-adjusted
Include entire population	No trends or comparison
	Labor intense and inefficient use of resources
	Not based on risk assessment

PRIORITY DIRECTED (TARGETED)

▶ Focus on:

  ▶ Care units

  ▶ Infections related to devices

  ▶ Invasive procedures

  ▶ Significant organisms – epidemiologically important

  ▶ High-risk, high-volume procedures

  ▶ Infections having known risk reduction methods

TARGETED SURVEILLANCE

Pros	Cons
Risk-adjusted rates	May miss some infections
Can measure trends and make comparisons	Limited information on endemic rates
More efficient use of resources	
Can target potential problems	
Identify performance improvement opportunities	
Can evaluate effectiveness of prevention activities	

COMBINATION

▶ Monitor:
  ▶ Targeted events in defined populations and
  ▶ Selected whole-house events
▶ Pros:
  ▶ Rates are risk-adjusted
  ▶ Measure trends
  ▶ Target potential problems
  ▶ Track selected events house-wide
▶ Cons:
  ▶ May miss some infections

SELECTION OF PROCESSES AND OUTCOMES

Processes
  ▶ Hand hygiene
  ▶ Urinary Catheter insertion/maintenance

Outcomes
  ▶ Acute respiratory infections
  ▶ Urinary tract infections
  ▶ Skin/Soft Tissue Infections
  ▶ Gastroenteritis

WHAT SHOULD BE INCLUDED?

▶ Mandatory/required

▶ Frequency (incidence) of the infection

▶ Communicability

▶ System/patient cost (↑morbidity, ↑LOS, ↑morbidity)

▶ Early Detection

Surveillance activities should be re-evaluated annually as a component of the IP risk assessment

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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

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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

APIC
Spreading knowledge.
Preventing infection.™

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Table 1. Comparison of Semiautomated vs Fully Automated Surveillance Approaches

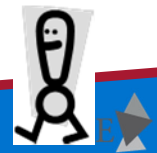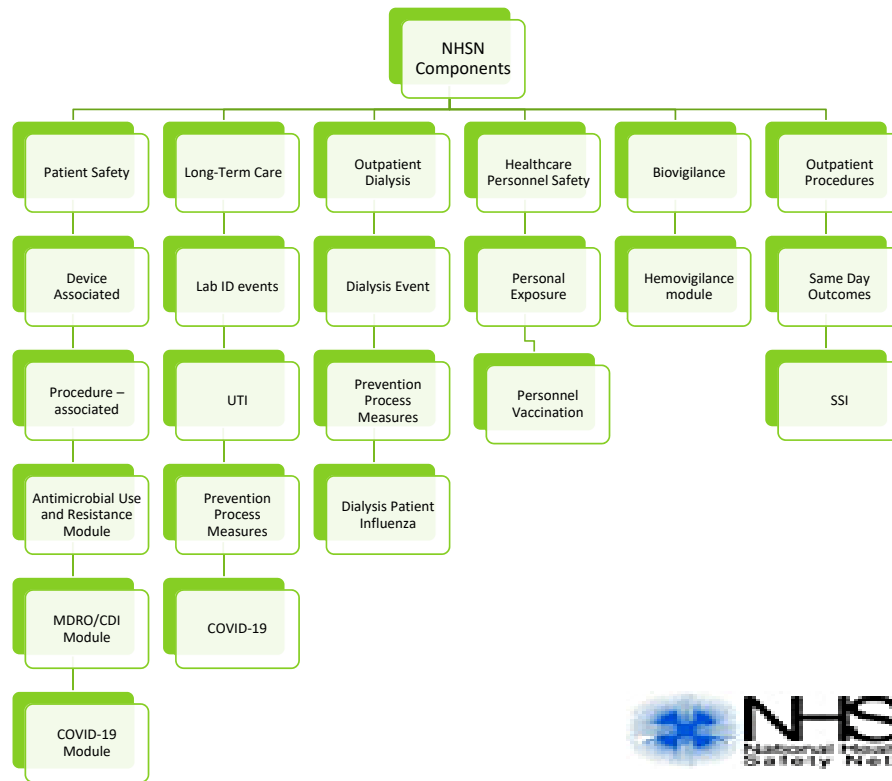| Characteristic	Semiautomated	Fully Automated
Clinical data	Accurate, reliable (clinical) data	Accurate, reliable (clinical) data
Definition	Standardized; not specifically adapted to automation	Standardized; adapted to automation (healthcare-associated infection metric)
Final ascertainment	Chart review required; some room for clinical judgment	No chart review; subjective interpretation impossible
Performance characteristics	High sensitivity, high negative predictive value	High specificity, high positive predictive value
Features	Clinical acceptance; room for adaptation within hospitals remains	Possible reduction in clinician buy-in; standardization, trade-off with sensitivity, specificity

https://academic.oup.com/cid/article/66/6/970/4161609

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CLINICAL DISAGREEMENT?

	Surveillance Definitions	Clinical Diagnosis
Purpose	Identify trends within a population for prevention	Identify disease in, and treatment for, individual patients
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

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

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THE ESSENTIALS OF SURVEILLANCE

▶ Know the protocol/criteria

▶ Consistently apply the criteria

▶ Report events meeting criteria; exclude those that don't

▶ Others may be trained to screen data sources, but the IP must make the final determination

▶ Retrospective chart review should only be used when patients are discharged before all information can be gathered

▶ Concerns about the criteria should be sent to NHSN-NOT addressed by non-reporting of events or facility adjudication

https://www.cdc.gov/nhsn/pdfs/opc/nhsn-overview-508.pdf

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STANDARDIZED DEFINITIONS

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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

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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 <u>first positive diagnostic test</u> 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 <u>do not</u> include a diagnostic test, the first documented <u>localized</u> sign or symptom that is an element of NHSN infection criterion should be use define the window

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

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KEY TERMS

➢ *Date of Event (DOE)*

- The date the **<u>first</u>** element used to meet an NHSN site-specific infection criterion occurs for the **<u>first</u>** time within the seven-day infection window period

<u>Note: The element MAY have been present before the infection window period</u>

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KEY TERMS

▶ *Present on Admission (POA)*

▶ When the date of "event" occurs during the POA time period.

▶ Defined as the day of admission to <u>an inpatient location</u> (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	
1 day before admit	Hospital Day 1	
Admission (Day 1)	Hospital Day 1	POA
Day 2	Hospital Day 2	
Day 3	Hospital Day 3	
Day 4	Hospital Day 4	HAI
Day 5	Hospital Day 5	

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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).

• Example-documented in the <u>current facilities medical</u> record

▶ patient states measured fever > 38.0° C or >100.4° F occurring in the POA timeframe

▶ nursing home reports fever prior to arrival to the hospital and occurring in the POA timeframe

▶ patient complains of dysuria

▶ copy of laboratory test result from another facility

• Physician diagnosis can be accepted **only** when physician diagnosis is an element of the specific infection criteria

Important

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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	
1 day before admit	Hospital Day 1	POA
1	Hospital Day 1	
2	Hospital Day 2	
3	Hospital Day 3	
4	Hospital Day 4	HAI
5	Hospital Day 5	

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.

KEY TERMS

➢ *Repeat Infection Timeframe (RIT)*

- A 14-day timeframe during which no new infections of the same type are reported.

- The <u>date of event</u> 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

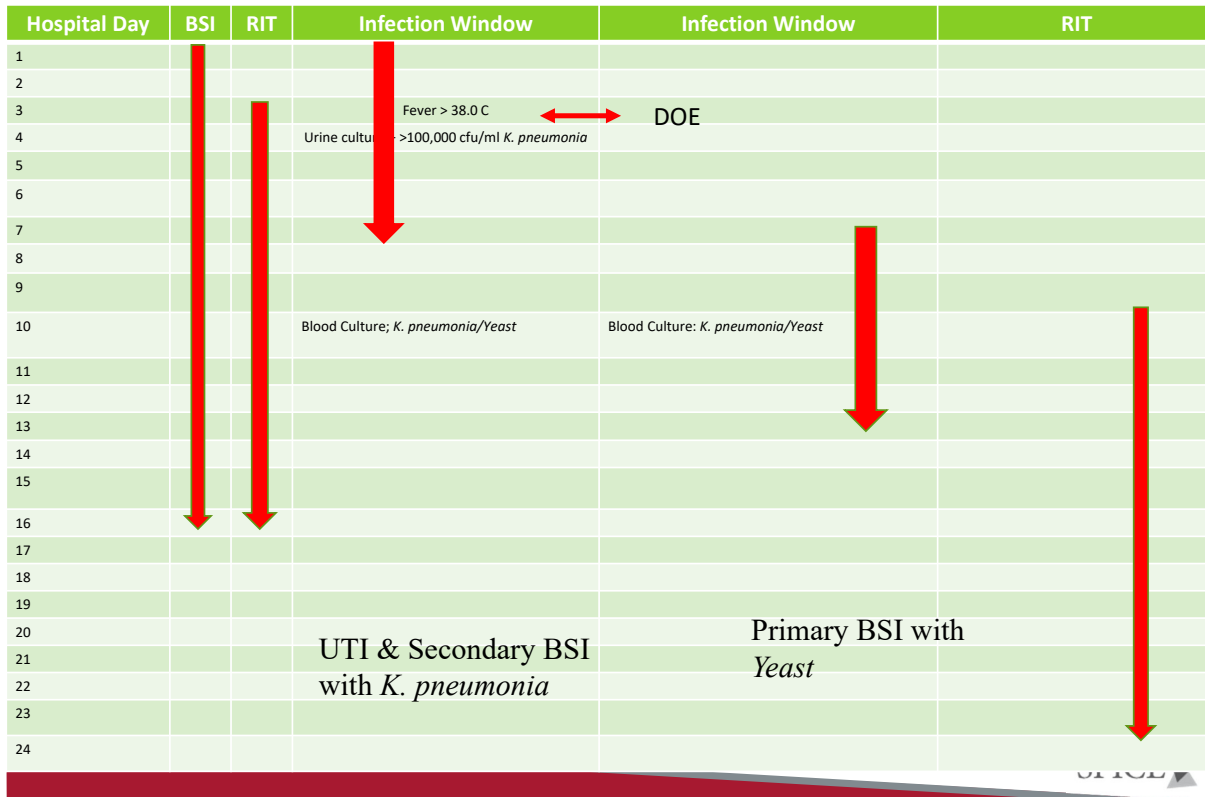- Do not change device-association determination during RIT

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

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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

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

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*

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

My Patients are sicker

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NHSN 2006-2008 SUMMARY: CLABSI IN LEVEL III NICUS

Central line-associated BSI rate

Birth Weight	Central line days	No. of CLABSI	Pooled Mean
≤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

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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

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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."

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WHY WE SHOULD VALIDATE

- State Health Department validations of <u>central line-associated bloodstream infection events</u> reported to NHSN-as of July 30, 2017
- 23 state health departments:
  - Sensitivity 82.9%
  - Specificity of 98.5 %
- Reasons:
  - Incorrect secondary BSI attribution
  - Misapplication of CLABSI definition
  - Missed case finding
  - Misapplication of LCBSI 2 definition and general NHSH definition
  - Clinical judgement over surveillance criteria

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WHY WE SHOULD VALIDATE

- Accuracy of <u>catheter-associated urinary tract infections</u> reported to NHSN January 2010 – July 2018
- 19 state health departments:
  - Sensitivity 88.3%
  - Specificity of 98.8 %
- Among misclassification:
  - 66% were underreported
  - 34% overreported
- Reasons:
  - Misapplication of CAUTI definition
  - Misapplication of general HAI definition
  - Clinical judgement over surveillance criteria

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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

Toolkit for Data Quality Checks for Reporting Facilities
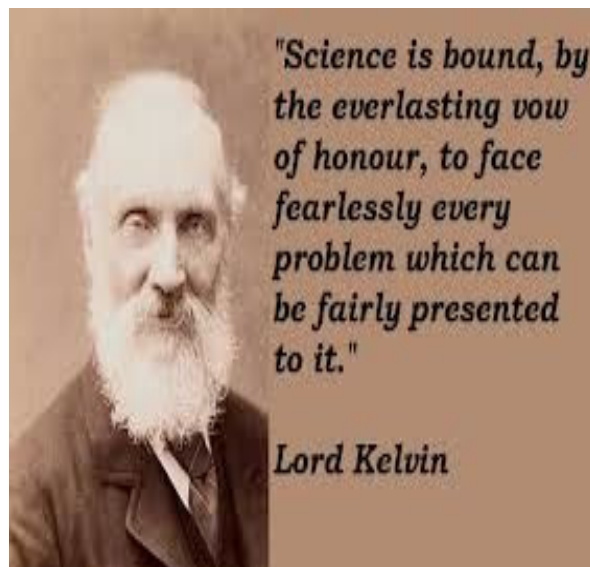
2020 Internal Validation Guidance

The NHSN Patient Safety Data Quality Check Guidance and Toolkit is purposed to assist facilities in conducting data quality checks of reported Central Line-Associated Bloodstream Infection (CLABSI), Catheter-Associated Urinary Tract Infection (CAUTI), Ventilator-Associated Event (VAE), Surgical Site Infection (SSI) following Abdominal Hysterectomy (HYST) and Colon (COLO) procedures, Methicillin-resistant Staphylococcus aureus (MRSA) Bacteremia and Clostridioides difficile infection (CDI) LabID events.

https://www.cdc.gov/nhsn/pdfs/validation/2020/2020-nhsn-iv-for-facilities-508.pdf

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

Alexander D. Langmuir

"Science is bound, by the everlasting vow of honour, to face fearlessly every problem which can be fairly presented to it."

Lord Kelvin

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Data:

Analysis and

Presentation-*April 20th*

Emily Sickbert-Bennett, M.S., PhD., CIC
Director for Hospital Epidemiology, UNC

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It's QUESTION TIME!!

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