North Carolina SPICE Statewide Program for Infection Control & Epidemiology

DEVELOPMENT OF AN INFECTION CONTROL PROGRAM FOR ACUTE CARE FACILITIES

Marty Cooney, DrPh, MPH, ME, BSN, RN, CIC
Associate Director,
NC Statewide Program for Infection Control and Epidemiology (SPICE)

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

1

OBJECTIVES

Review	Provide	Discuss
Review the burden of Healthcare-associated infections (HAI)s	*Provide an overview of the evolution of Infection Prevention & Control*	*Discuss core components of an infection prevention program*

SPICE

2

CDC 2022 NATIONAL AND STATE HAI PROGRESS REPORT

(11/2023)

- The 2022 annual National and State Healthcare-Associated Infections (HAI) Progress Report provides a summary of select HAIs across four healthcare settings: acute care hospitals (ACHs), critical access hospitals (CAHs), inpatient rehabilitation facilities (IRFs) and long-term acute care hospitals (LTACHs).
  - Central line-associated bloodstream infections (CLABSIs)- ↓9%
  - Catheter-associated urinary tract infections (CAUTIs))-↓12%
  - Ventilator-associated events (VAEs)-↓19%
  - Surgical site infections (SSIs)- no significant change
  - Methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream events-↓16%
  - *Clostridioides difficile (C. difficile)* events- ↓3%

3

BURDEN OF HEALTH CARE-ASSOCIATED INFECTION *(HAI)*

- Each day, approximately **one in thirty-one** patients AND **one in 43 residents**' contracts at least one infection in association with their healthcare.[1]
- CDC estimates that on any given day, about 50% of hospital patients and 1 in 12 nursing home residents receive an antimicrobial medication. [2]
- Research suggests that a growing number of HAIs are caused by pathogens (germs) that are outsmarting the antimicrobial medications typically used to fight them.[2]

[1]CDC Progress Report
[2]https://www.cdc.gov/hai/eip/antibiotic-use.html

4

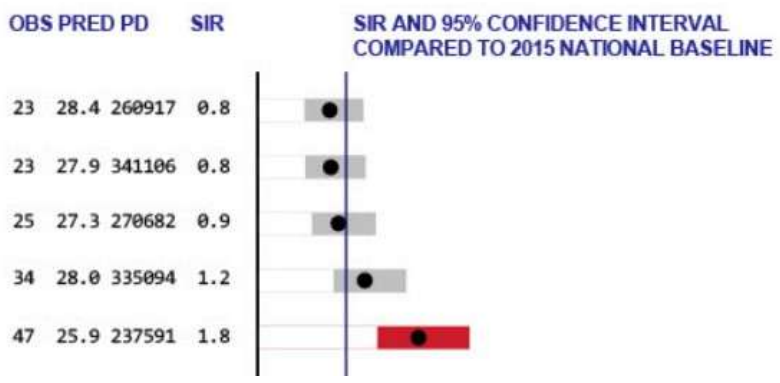
NC HAI ANNUAL REPORT (*JAN 2022-DEC 2022*)

HTTPS://EPI.DPH.NCDHHS.GOV/CD/HAI/FIGURES/2022/2022_ANNUAL_REPORT.PDF

Metric	# Observed Infections	# Predicted infections	Compare to National Experience
CLABSI	729	653.68	WORSE
CAUTI	572	705.71	BETTER
Abd Hysterectomy (SSI)	66	70.48	SAME
Colon (SSI)	309	310.73	SAME
MRSA LabID	370	417.95	BETTER
C diff LabID	1,235	3,090.2	BETTER

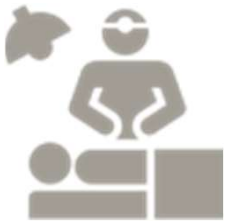
5

MRSA LabID EVENTS



6

RISK FACTORS



Invasive procedures

Severity of Illness

Not adhering to best practices for prevention

Overuse or improper use of antibiotics

SPICE

7

OBJECTIVES

Review	Provide	Discuss
Review the burden of Healthcare-associated infections (HAI)s	***Provide an overview of the evolution of Infection Prevention/Control***	***Discuss core components of an infection prevention program***

SPICE

8

- ***"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
Authors:
Deverick J Anderson, MD, MPH; N Deborah Friedman, MPH, MBBS, FRACP, MD
Section Editor:
Daniel J Sexton, MD
Deputy Editor:
Meg Sullivan, MD

SPICE

9

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

SPICE

10

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.

11

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.

12

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

SPICE

13

EVOLUTION OF THE PROFESSION

- APIC founded in 1972 by a small group of infection control nurses
- Now serves >15,000 members across 48 countries
- Certification Board of Infection Control-CBIC
  - Initial proctored exam only
  - Recertify every 5 years by test only
  - Recertify with SARE
  - Recertify by IPUs
  - a-IPC
  - LTC-ICP

Effective January 1, 2026, the open-book untimed recertification examination will no longer be offered. Recertification will be obtainable through infection prevention units (IPUs) or by retaking the initial CIC® proctored examination.

SPICE

14

OBJECTIVES

Review	Provide	Discuss
Review the burden of Healthcare-associated infections (HAI)s	*Provide an overview of the evolution of Infection Prevention/Control*	***Discuss core components of an infection prevention program***

SPICE

15

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

16

SPICE

16

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)
    - ***TJC- Hospital assigns responsibility for daily management of IC activities (written authority statement included in the program)***

17

17

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

18

18

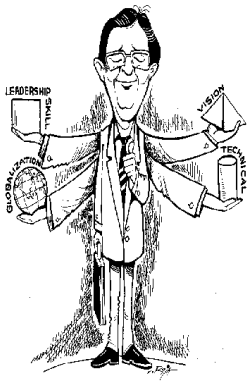
INFECTION PREVENTION TEAM

- 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

19

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

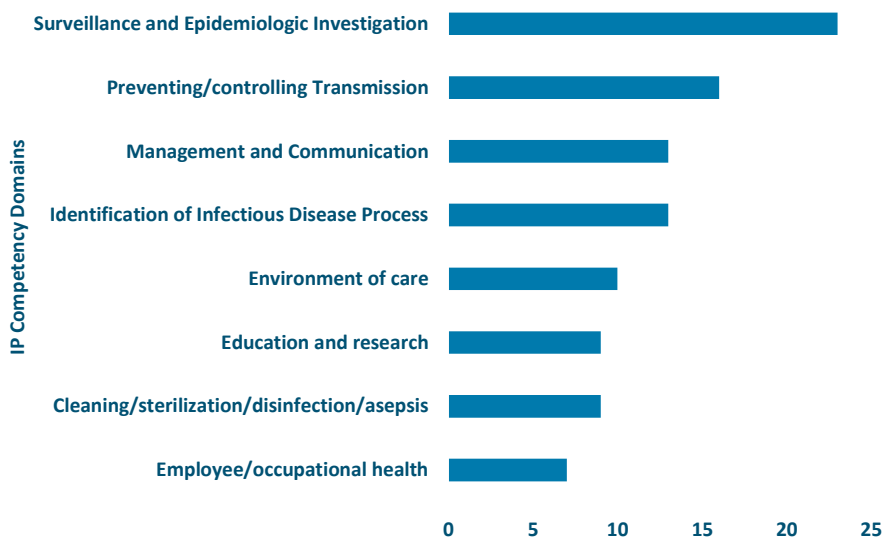
20

APIC Megasurvey
2020 Findings

- Follow up to the 2015 Megasurvey
- Response rate thirteen percent (13%)
- Conducted between January 21st and February 28th, 2020
- Slightly less than 50% respondents currently certified and plan to recertify
- Less than 50% reported feeling adequately satisfied with compensation
- All settings:
  - Only 14% of respondents indicated 100% of their job dedicated to IPC
  - 27% indicated between 26-75%

21

% Time Spent on IPC Activities



•10.1016/j.ajic.2022.12.002

22

IP 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

23

STAFFING CHALLENGES

- Recruitment and hiring practices in U.S. infection prevention and control departments: Results of a national survey[1]
  - Vacant IP position reported by 25%
  - 56% reported positions vacant < 3 months; 24% 3- 6 months and 15% 6-12 months
- Retirements
  - 52% anticipate in the next 1-2 years
- Non-acute care settings[2]
  - Less than 50% of time officially dedicated to IPC

[1]H Gilmartin, SM Reese, S Smathers: AJIC-Volume 49 Number 1 pgs 70-74
[2]M Pogorzelska-Maziarz, E Kalp: AJIC 45 (2017) 597-602

24

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

25

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 **<u>1.0 IPC FTE per 69 beds</u>** 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

26

IP STAFFING LEVELS AND RATES OF 10 TYPES HAI

- Objective: To quantitatively evaluate relationships between infection preventionists (IPs) staffing levels, nursing hours, and rates of 10 types of healthcare-associated infections (HAIs).
- Design and setting: Observation in a 528-bed teaching hospital.
- Patients: All inpatients from **July 1, 2012, to February 1, 2021.**
- Results: The observation covered 1.6 million patient days of surveillance. IP staffing levels fluctuated from ≤2 IP FTE (critically low) to 7–8 IP FTE (recommended levels).
- Periods of highest CAUTI SIRs, hospital-onset C. *difficile* and CRE rates, along with 4 of 5 types of surgical site SIRs coincided with the periods of **lowest IP staffing levels** and the **absence of certified IPs and a healthcare epidemiologist**.
  - Central-line–associated bloodstream infections increased amid lower nursing levels despite the increased presence of an IP and a hospital epidemiologist.

https://doi.org/10.1017/ice.2021.507

27

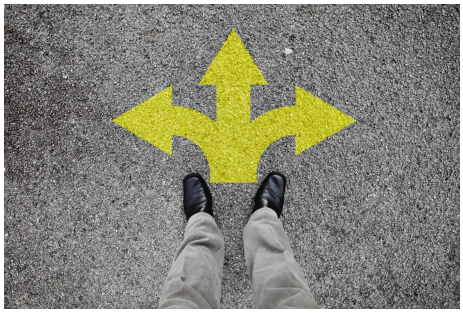
WRITTEN POLICIES AND PROCEDURES

- 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.,)

28

EDUCATION, TRAINING, COMPETENCY

- Education
  - Process of receiving systematic instruction resulting in the acquisition of theoretical knowledge
- Training
  - Focuses on gaining specific technical skills (often manually performed)
- Competency
  - Requires a third attribute (ability)
  - Ability is being able to "do something"



29

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

30

30

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

31

COMPETENCY

- **Competency** (see HR.01.06.01) differs from education and training in that ***competency incorporates all three attributes: Knowledge, technical skills, and ability*** - all are required to deliver safe care, correctly perform technical tasks, etc.
- Assessing competency, then, is the process by which the organization validates, via a defined process, that an individual ***has the ability to perform a task, consistent with the education and training provided***. **(TJC)**
- 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.

32

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

33

33

FEEDBACK

- Feedback improves motivation and learning
- It supports performance improvement
- Actively involving staff can enhance the feedback effects and efforts
- Feedback should be specific to implement change
  - Timely
  - Valid
  - Sustained

34

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.

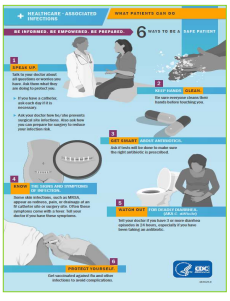
- ***Safe***: Patients should not acquire an SSI as the result of a surgical procedure
- ***Effective***: Femoral site should not be used for CL access; surgical prophylaxis appropriate and timely
- ***Patient-Centered***: Patients on transmission-based precautions should not receive a lower standard 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

SPICE

35

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

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

SPICE

36

36

KEY ELEMENTS – EMPLOYEE HEALTH

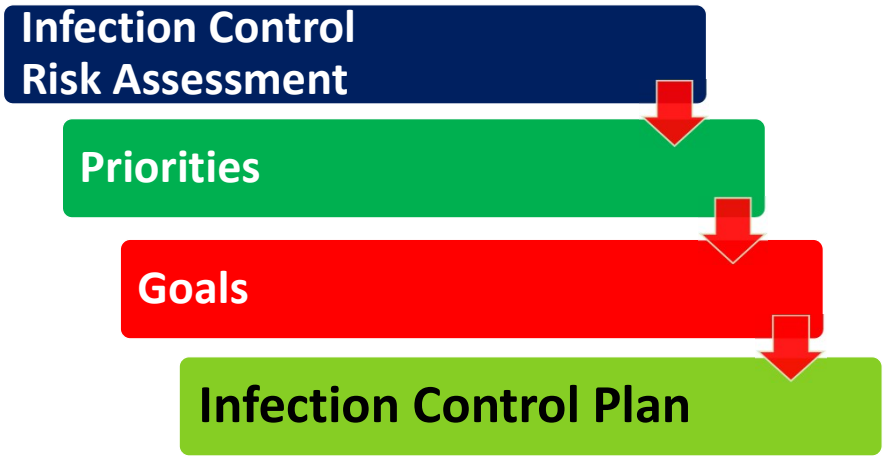
Immunize	Establish	Adhere
Immunize against vaccine-preventable diseases • Hepatitis B • Influenza • MMR • Varicella • Tetanus, diphtheria, pertussis • COVID-19	Establish sick leave policies that encourage: • Healthcare personnel to stay home when they are ill • Reporting of signs, symptoms, and diagnosed 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

37

INFECTION PREVENTION RISK ASSESSMENT

38

INFECTION CONTROL RISK ASSESSMENT IS ESSENTIAL TO INFECTION CONTROL PLAN



39

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)

https://www.cdc.gov/infectioncontrol/pdf/icar/hospital.pdf

40

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	

SPICE

41

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**

SPICE

42

	Likelihood	Severity	Preparedness	Risk Score
Facility Related	**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**

SPICE

43

2 TYPES OF EVENTS/RISKS

Community/External

- TB risk (HCP & patients)-
- Emerging pathogens-COVID-19
- 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

SPICE

44

RISK ASSESSMENT TIPS

- Proactive….prioritize risk or events that can cause harm
- No less than annual and/or revised during the 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

SPICE

45

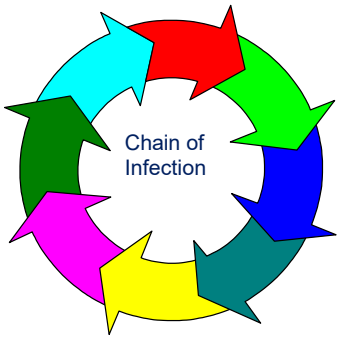
SURVEILLANCE PLAN

SPICE

46

ELEMENTS REQUIRED FOR AN INFECTION

- Chain of Infection:
  - Infectious agent
  - Reservoir
  - Portal of Exit
  - Portal of Entry
  - Means of Transmission
  - Susceptible host

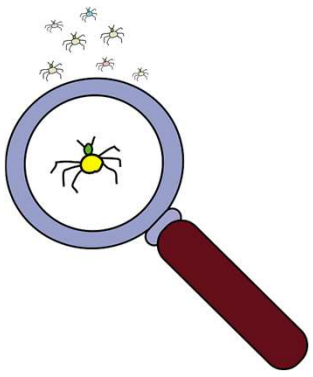


- All of these factors are present in all healthcare settings

47

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



48

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"

APIC TEXT OF INFECTION CONTROL AND EPIDEMIOLOGY

SPICE

49

NEED FOR SURVEILLANCE

- One of the most important aspects of an IP's responsibilities
- Should cover patients and healthcare personnel
- Include process and outcome measures

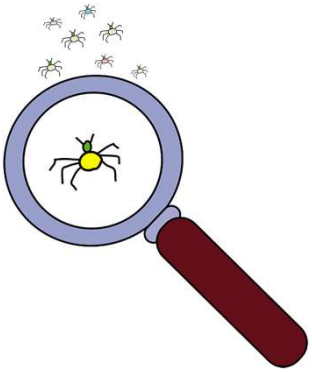
Establish Baseline Data
Reduce Infection Rates
Detection of Outbreaks
Monitor Effectiveness of Interventions
Education of HCP

Required as a Component of Plan

SPICE

50

TYPES OF SURVEILLANCE



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

51

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

52

52

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

53

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	

54

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

55

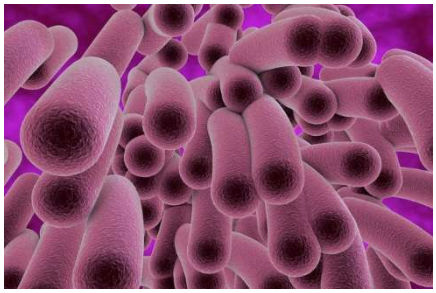
SELECTION OF PROCESSES AND OUTCOMES

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

57

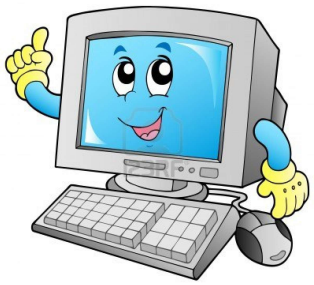
COLLECTING SURVEILLANCE DATA

- Train personnel in data collection methods
- Develop a data collection form to fit the surveillance objective-based on the definition
- 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

58

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



SPICE

59

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

SPICE

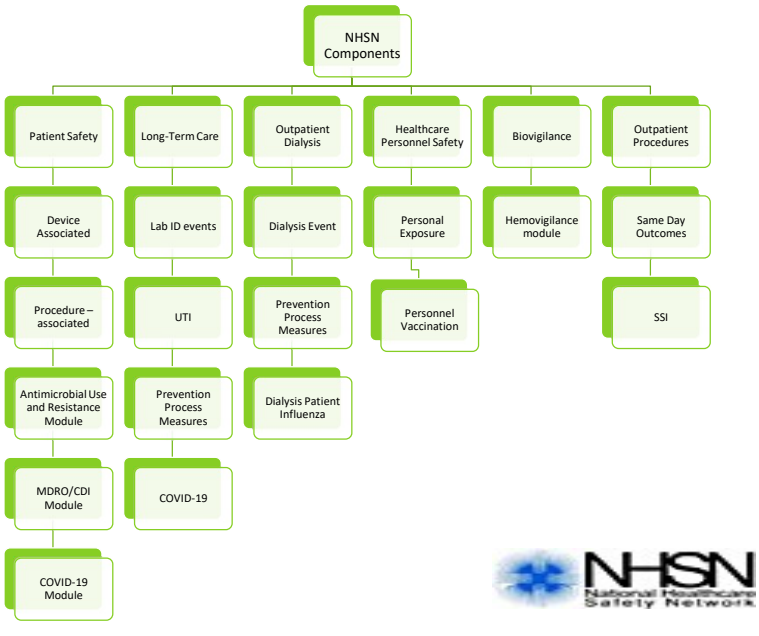
60

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

61



62

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

SPICE

63

LAYING A STRONG FOUNDATION FOR NHSN SURVEILLANCE

SPICE

64

NHSN KEY ELEMENTS

- 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

SPICE

65

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

SPICE

66

EXCLUDED ORGANISM

- Rarely or not known to be causes of HAIs
  - Blastomyces, Histoplasma, Coccidioides, Paracoccidioides, Cryptococcus and Pneumocystis
- Reactivation of latent infections
  - Herpes, shingles, syphilis or tuberculosis are examples but may not be limited to these events
- Individual event protocols for pathogen exclusions specific to event

The following excluded organisms cannot be used to meet the UTI definition:

- Any *Candida* species as well as a report of "yeast" that is not otherwise specified
- mold
- dimorphic fungi or
- parasites

SPICE

67

It is possible that your laboratory may identify an organism that cannot be found when referencing the NHSN Organism List. DO NOT interpret the absence of an organism to mean the event is not reportable. If you have an organism which is not found on the NHSN Organism List, please contact us at nhsn@cdc.gov for guidance on appropriate reporting.

NHSN Code	NHSN Organism Category	NHSN Display Name	SNOMED Preferred Term	SNOMED Code
ABISP	ALL/MBI/UTI	Abiotrophia	Abiotrophia	115161005
GRADI*2	ALL/MBI/UTI	Abiotrophia adiacens	Granulicatella adiacens	113713009
GRADI*3	ALL/MBI/UTI	Abiotrophia adjacens	Granulicatella adiacens	113713009
STRDF	ALL/MBI/UTI	Abiotrophia defectiva	Abiotrophia defectiva	113714003
GRANELEG*1	ALL/MBI/UTI	Abiotrophia elegans	Granulicatella elegans	115944008
ACANT	ALL	Acanthamoeba	Acanthamoeba	50875003
ACHOSP	ALL/UTI	Acholeplasma	Acholeplasma	84858009
ACHOLAID	ALL/UTI	Acholeplasma laidlawii	Acholeplasma laidlawii	89082003
ACHOOCUL	ALL/UTI	Acholeplasma oculi	Acholeplasma oculi	86450009
ACHSP	ALL/UTI	Achromobacter	Achromobacter	91620006
ACHDENI	ALL/UTI	Achromobacter denitrificans	Achromobacter denitrificans	413414001
ACHPIEC	ALL/UTI	Achromobacter piechaudii	Achromobacter piechaudii	413420000
ACHRUHL	ALL/UTI	Achromobacter ruhlandii	Achromobacter ruhlandii	413421001
ALCXYL	ALL/UTI	Achromobacter xylosoxidans	Achromobacter xylosoxidans	413424009
ACHXYL	ALL/UTI	Achromobacter xylosoxidans xylosoxidans	Achromobacter xylosoxidans xylosoxidans	423897003
ACISP	ALL/UTI	Acidaminococcus	Acidaminococcus	28207003
ACIFE	ALL/UTI	Acidaminococcus fermentans	Acidaminococcus fermentans	63005002
AFB	ALL/UTI	Acid-fast bacillus	Acid-fast bacillus	243365003
ACIDSP	ALL/UTI	Acidovorax	Acidovorax	115153000
ACDEL	ALL/UTI	Acidovorax delafieldii	Acidovorax delafieldii	113685003
ACIDFACI	ALL/UTI	Acidovorax facilis	Acidovorax facilis	113686002
ACIDTEMP	ALL/UTI	Acidovorax temperans	Acidovorax temperans	113687006
ACS	ALL/UTI	Acinetobacter	Acinetobacter	7757008
ACBA	ALL/UTI	Acinetobacter baumannii	Acinetobacter baumannii	91288006
ACICBA	ALL/UTI	Acinetobacter calcoaceticus	Acinetobacter calcoaceticus	82550008
ACCA	ALL/UTI	Acinetobacter calcoaceticus-baumannii complex	Acinetobacter calcoaceticus-Acinetobacter baumannii complex	113376007

READ ME | Combined | All Organisms (ALL) | Common Commensals (CC) | MBI Organisms (MBI) | UTI Bacteria (UTI)

https://www.google.com/search?q=nhsn+organism+list&rlz=1C1CHBF_enUS831US838&oq=&aqs=chrome.0.35i39i362l8.61145j0j7&sourceid=chrome&ie=UTF-8

SPICE

68

OBSERVATION PATIENT

- If an observation patient is admitted to an inpatient location:
  - Included in all surveillance events in the monthly reporting plan
  - Included in patient and device day counts
- Housed, monitored, and cared for in an inpatient location
  - At risk for healthcare-associated infection

24- hour observation unit ≠ inpatient unit

69

NEWBORN INFECTIONS

- Infections occurring with the date of event on hospital day 1 or 2 are considered POA.
- Day 3 or later are an HAI
- Excluded Infections:
  - Acquired transplacentally
    - Example (not limited to) herpes simplex, toxoplasmosis, rubella, cytomegalovirus, or syphilis
  - A result from passage through the birth canal
- Exception: Group B Streptococcus during a neonate's first 6 days of life

70

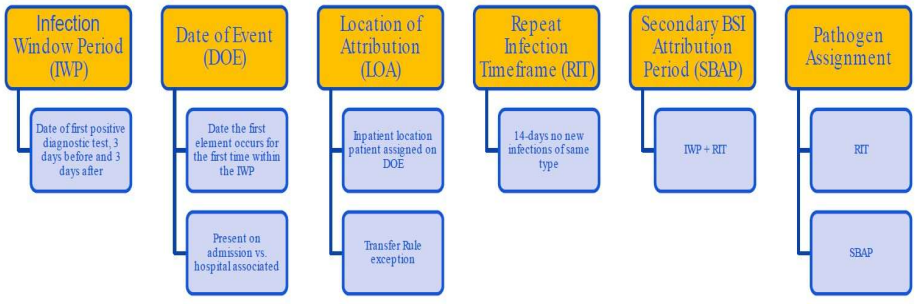
PHYSICIAN DIAGNOSIS

- **ONLY** can be used when physician diagnosis is an element of the specific infection definition:
  - For example, physician diagnosis **IS NOT** an element of any UTI definition; therefore, physician diagnosis of a UTI CANNOT be used to satisfy the definition
  - For example, physician diagnosis **IS** an element of superficial SSI; therefore, physician diagnosis can be used to satisfy the superficial SSI definition

SPICE

71

NHSN Foundational Building Blocks



SPICE

72

KEY TERMS

NHSN Infection Window Period:

The 7-day period: in which all site-specific infection criteria must be met.

- The **collection** date of **the first positive diagnostic test that is used as an element** to meet the site-specific infection criterion, **PLUS**
- The 3 calendar days before and the 3 calendar days after.

73

INFECTION WINDOW PERIOD CONSIDERATIONS

- Use the **FIRST** diagnostic test that creates an IWP during which **ALL** elements of the criterion can be found
  - Laboratory specimen
  - Imaging test
  - Procedure or exam
- When a diagnostic test is not a part of the site-specific criterion, localized signs or symptoms may be used to set the IWP
  - Diarrhea
  - Site specific pain
  - Purulent exudate

Cannot use non-specific sign/symptom such as fever

74

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

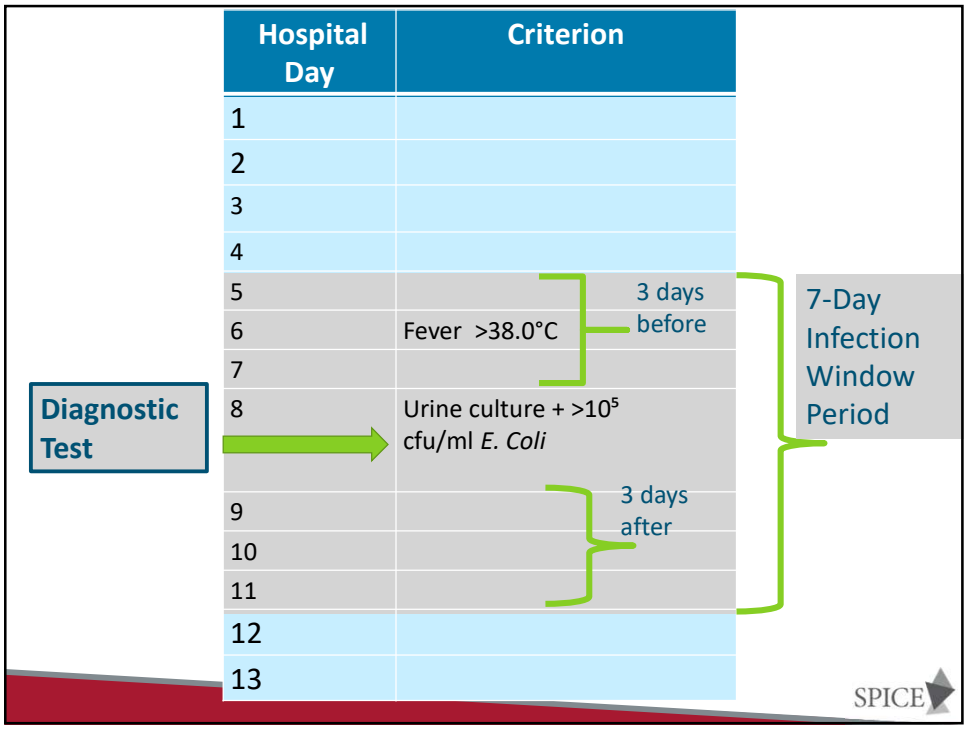
Note: The element MAY have been present before the infection window period

75

DATE OF EVENT (DOE)

- Accurate determination of DOE is critical because DOE is used to determine:
  - if an event is HAI or POA
  - device association
  - location of attribution
  - day 1 of the Repeat Infection Timeframe

76



77

KNOWLEDGE CHECK

- The date of event (DOE) is ***ALWAYS*** the date of the diagnostic test.

1. False
2. True

78

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	

79

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 current facilities medical 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

80

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	
3	Hospital Day 3	HAI
4	Hospital Day 4	
5	Hospital Day 5	

81

LOCATION OF ATTRIBUTION (LOA)

- Inpatient location where the patient is assigned on the DOE
  - Non-bedded locations are not eligible for assignment
    - Operating room (OR)
    - Interventional Radiology (IR)
    - Emergency department (ED)
- Exception =Transfer Rule
  - DOE on date of transfer or discharge, or the next day
  - Attributed to the transferring/discharge location
  - Address incubation of infection

Does NOT apply to SSI and LabID events

82

TRANSFER RULE

- Multiple transfers
  - Attribute the infection to the first location in which the patient was housed on the day before the DOE

DOE →

Date	Patient location	LOA
7/8	SICU	
7/9	SICU	
7/10	SICU 3 West 4 East	
7/11	4 East	SICU
7/12	4 East	
7/13	4 East	

83

KEY TERMS

- *Repeat Infection Timeframe (RIT)*
  - A 14-day timeframe during which no new infections of the same type are reported.
  - Applies to both **POA and HAI** determinations
  - 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

84

Hospital Day	RIT	SUTI Criterion
1		
2		
3 DOE	1	Fever >38.0°C
4	2	Urine culture + >10^5 cfu/ml *E. Coli*
5	3	
6	4	
7	5	
8	6	
9	7	
10	8	
11	9	
12	10	
13	11	
14	12	
15	13	
16	14	

85

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

86

Hospital Day	BSI	RIT	Infection Window	Infection Window	RIT
1					
2					
3			Fever > 38.0° C		
4			Urine culture + >100,000 cfu/ml *K. pneumonia*		
5					
6					
7					
8					
9					
10			**Blood Culture; *K. pneumonia/Yeast***		
11					
12					
13					
14					
15					
16					

87

KNOWLEDGE CHECK

- What is the Infection Window Period (IWP)?

Hospital day 1 – day 7

- What is the DOE?

Hospital day 3

- What is the Repeat Infection Timeframes?

Hospital day 3 – day 16

Hospital day 10 – day 23

- What is the Secondary BSI Attribution Period?

Hospital day 1 – day 16

- What is the HAI determination(s)?

UTI with 2nd BSI K. pneumonia

LCBI with yeast

88

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

89

REMEMBER

- **Present on Admission (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.
- **Healthcare Associated Infection (HAI):** An infection is with a date of event on or after the 3rd calendar day of admission to an **inpatient location where day of admission is calendar day 1.**
- **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
- **Transfer Rule:** If the **date of event is on the date of transfer or discharge, or the next day,** the infection is attributed to the transferring/discharging location.
- **Repeat Infection Timeframe (RIT):**a 14-day timeframe during which no new infections of the same type are reported.

90

KNOWLEDGE CHECK # 1

- The concepts reviewed in this presentation do not apply to Surgical Site Infections (SSIs), Laboratory-Identified Events (LabIDs), or Ventilator-Associated Events (VAEs).

1. True
2. False

SPICE

91

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

SPICE

92

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."

93

WHY WE SHOULD VALIDATE

- State Health Department validations of central line-associated bloodstream infection events 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

AJIC Volume 46, Issue 11, November 2018 Pages 1290-1295

94

WHY WE SHOULD VALIDATE

- Accuracy of catheter-associated urinary tract infections 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

AJIC Volume 48, Issue2, February 2020 Pages 207-211

95

Toolkit for Data Quality Checks for Reporting Facilities

2020 Internal Validation Guidance

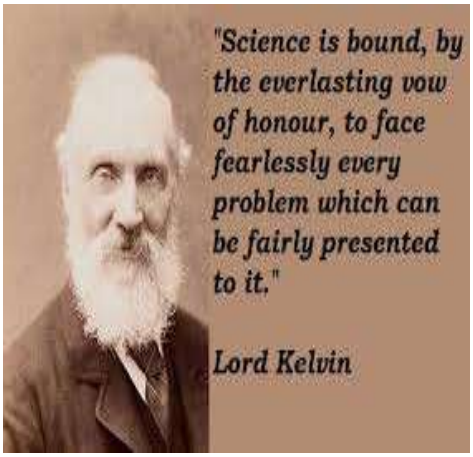
The NHSN Patient Safety Data Quality Check Guidance and Toolkit is purposed to assist facilities in conducting data quality checks of reported Central Line-Associated Bloodstream Infection (CLABSI), Catheter-Associated Urinary Tract Infection (CAUTI), Ventilator-Associated Event (VAE), Surgical Site 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

96

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

Alexander D. Langmuir



97

98