



NHSN: Tackling HAI Reporting_h In Oklahoma

Gloria C. Morrell RN, MS, MSN, CIC
Nurse Consultant

Division of Healthcare Quality Promotion
Centers for Disease Control and Prevention
Nothing to disclose

Nov 2010

SAFER • HEALTHIER • PEOPLE™



Objectives

1. Discuss one aspect of surveillance
2. Identify location of definition for healthcare-associated infection and where criteria for specific sites of infection can be found
3. Apply site-specific infection criteria to case studies
4. Count device- and patient-days correctly



Surveillance

- It's a method for YOU as IP to track infections, diseases, pathogens or occurrences important to you and your facility
- Systematic
- Based on national guidelines
- May be simple
- Must be consistent



Purposes of Surveillance

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



Purposes of Surveillance



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

Recommendations for HAI Surveillance



- Active
- Prospective
- Patient-based
- Incidence
- Priority-directed
- Risk-adjusted





NHSN IS...

- Designed to obtain surveillance data that are:
 - Objective
 - Measureable
 - Comparable



NHSN is NOT...

- An application designed to track patient's clinical infections, outcomes or treatments



NSHN- a Surveillance Tool

- Criteria designed to look at a population at risk
- Identify patients meeting the criteria
- Use of consistently applied criteria
- To ensure the value of metrics used to compare these populations



Healthcare-associated Infection (HAI)

- A localized or systemic condition resulting from an adverse reaction to the presence of an infectious agent(s) or its toxin(s) that
 - Occurs in a patient in a healthcare setting and
 - Was not present or incubating at the time of admission, unless the infection was related to a previous admission
- When the setting is a hospital, meets the criteria for a specific infection (body) site as defined by CDC
- When the setting is a hospital, may also be called a nosocomial infection



CMS HAI Reporting Requirements

SAFER • HEALTHIER • PEOPLE™

HAI Reporting Requirements – FY 2013

Hospitals participating in the CMS Inpatient Prospective Payment System (IPPS) Hospital Inpatient Quality Reporting Program will be required to submit HAI data:

- Central line-associated bloodstream infection (CLABSI) events that occur on or after January 1, 2011 for Fiscal Year (FY) 2013 payment
- Via Centers for Disease Control's (CDC) National Healthcare Safety Network (NHSN)
- For **ALL** adult, pediatric intensive care units (ICU) and neonatal intensive care units (NICU)*
- In accordance with NHSN Patient Safety Component protocols (<http://www.cdc.gov/nhsn/psc.html>)

**Restricted to Level II/III and Level III NICU*



HAI Reporting Requirements – FY 2014

Surgical Site Infection (SSI) HAI Measure:

- SSI for selected operative procedure categories beginning January 1, 2012 for FY 2014 payment



CLABSI Reporting Requirements

CLABSI Reporting Requirements Timeline

- Data collection begins with January 1, 2011 events
- First reporting quarter: January 1 to March 31, 2011
- First quarterly data due into NHSN: August 15, 2011
- First public report available on *Hospital Compare*: December, 2011



And the definitions are...

AJIC major articles

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

Teresa C. Horan, MPH, Mary Andrus, RN, BA, CIC, and Margaret A. Dudeck, MPH
Atlanta, Georgia

BACKGROUND

Since 1988, the Centers for Disease Control and Prevention (CDC) has published 2 articles in which nos-

population for which clinical sepsis is used has been restricted to patients ≤ 1 year old. Another example is that incisional SSI descriptions have been expanded to specify whether an SSI affects the primary or a secondary in-

Horan TC, Andrus ML, Dudeck MA. CDC/NHSN surveillance definition of healthcare-associated infection and criteria for specific types of infections in the acute care setting. *Am J Infect Control* 2008;36:309-32.

<http://www.cdc.gov/ncidod/dhqp/pdf/NNIS/NosInfDefinitions.pdf>



Case Studies





NHSN Operative Procedure Includes:



- Surgery completed in a single trip to the OR
- Incision closed before leaving OR
- Surgery conducted in defined operating room suite
- May be an in- or out-patient procedure
- Laparoscopic & traditional approaches included



Case 1



- 45 year-old male patient had colon resection (COLO) performed on 6/18
- 6/22:
 - The upper aspect of the patient's abdominal wound has purulent drainage with some redness and induration
 - Wound swabs sent to lab for culture
 - Patient started on antibiotics
- 6/24:
 - Wound culture grew *Enterobacter* spp. and *E. coli*



Case 2

- Patient is admitted to the hospital on 04/12 for elective surgery and active MRSA screening test is positive.
- On the same day, patient undergoes colon surgery (COLO).
- On 4/16, a deep incisional SSI is identified, and is culture positive for MRSA.

Is this infection considered healthcare-associated?



HAI

- The following conditions are not infections:
 - Colonization (presence of microorganisms on skin, mucous membranes, in open wounds, or in excretions or secretions but are not causing adverse clinical signs or symptoms)
 - Inflammation that results from tissue response to injury or stimulation by noninfectious agents, such as chemicals



Case 3



- Which of the following does not meet the criteria for superficial incisional SSI if identified within 30 days after the procedure?
 - A. Physician documents “superficial wound infection”
 - B. Purulent drainage noted from upper aspect of incision
 - C. Physician documents “cellulitis”
 - D. MRSA grows from an aseptically obtained swab of the superficial incision



Case 4



- Jane Doe had a spinal fusion (FUSN) performed
- Increased back pain
- MRI revealed abscess in the spinal epidural space
- Surgeon opened wound & drained abscess; specimen to lab for culture
- Culture positive for *Pseudomonas aeruginosa*



Case 4

- Does this patient have an HAI?
- If so, what type?



Case 5

- 4/8 John Smith (JS) had a tunneled central line placed in the OR, due to failure of a hemodialysis fistula during an inpatient hospitalization. He was discharged and continued on outpatient hemodialysis using the line.
- 8/22 JS readmitted with redness and purulent discharge at the insertion site. Blood cultures are negative.



Case 5

- Would this be an SSI?
- Why or why not?



Case 5

- If it is not an SSI, and in addition to the signs/ symptoms listed, the blood culture was positive for MSSA, would this be called a BSI attributed to your facility?

Case 5b

CDC

- Substitute a ventricular shunt placement for the dialysis shunt. This shunt had not been manipulated/accessed and had been functioning fine.
- On 6/22 the patient is admitted with redness overlying the incision and it is opened subcutaneously by the surgeon and drained of milky fluid
- (Surgery performed 4/22).

Case 5b

CDC

- Is this an SSI?
- If so what type?
- If not, why not?

No, because this infection lies within the subcutaneous layer of tissue, it must appear within 30 days to be meet criteria of a superficial SSI.

A **superficial incisional SSI** must meet one of the following criteria:

Infection occurs **within 30 days** after the operative procedure and involves only skin and subcutaneous tissue of the incision and patient has at least one of the following:

- a. purulent drainage from the superficial incision.
- b. organisms isolated from an aseptically obtained culture of fluid or tissue from the superficial incision.
- c. at least one of the following signs or symptoms of infection: pain or tenderness, localized swelling, redness, or heat, and superficial incision is deliberately opened by surgeon, and is culture-positive or not cultured. A culture-negative finding does not meet this criterion.
- d. diagnosis of superficial incisional SSI by the surgeon or attending physician.



Case 6

- A 66-year-old woman is admitted on Sept 10th as an inpatient, having recently noticed blood in her stool
 - Diagnostic investigation reveals colon carcinoma
- 9/11 - Operation: hemicolectomy
- 9/13 - Temperature max of 38.7°C, abdominal pain; abscess of the abdominal wall per ultrasound



Case 6

- 9/14 - I&D of the abdominal wall abscess
 - Abscess culture collected
 - Operation report notes, the fascial layer is partially affected
 - Antibiotics begun
- 9/18 - Discharge from hospital on oral antibiotics. Abscess culture positive for *E.coli*



Case 6



- Is this an HAI?
- If so what type?



Case 6b



- Let's change the scenario and say that at the time of the I & D, it was discovered the patient had suffered an anastamotic leak from which the abscess developed



Case 7

- A 79-year-old male patient is brought from a nursing home after a fall and is admitted to hospital with a fractured neck of femur. Upon admission the nursing home indicates that the patient has MRSA colonization
 - While the patient is still in the emergency room cultures are taken from the nose, pharynx, perineum and groin



Case 7

- Day 1 – HPRO completed. Antibiotic prophylaxis is administered peri-operatively.
- Day 2 - The patient is very confused. Temperature normal. Wound condition good.
- Day 3 -The results of the admission cultures of the nose and groin = MRSA
- The following entry is found in the patient's notes: "Patient removed the dressing several times. Recurrent confused condition. Wound edges very red and taut."



Case 7

- Day 5 - Entry in the patient's notes:
"Abscess lanced by the attending surgeon"
 - A wound culture sent to lab
 - Antibiotics begun
- Day 6- Wound culture: MRSA
- Day 9 -Improvement in wound condition
 - Sent to rehabilitation unit



Case 7

- Does this patient have an SSI?
- If so, what Type?
- If so, what is the date of the infection?



Case Study 8

- 7/7 Mrs. Jones has a saphenous endoscopic harvest and an internal mammary vein used for her coronary artery bypass surgery The ICD codes entered are:
 - 36.12 (CBGB)
 - And 36.15 (CBGC)If the saphenous vein was harvested endoscopically, what NHSN operative procedure code(s) should be entered into NHSN?



Case Study 8

- If the saphenous vein is harvested endoscopically, what NHSN operative procedure code(s) should be entered into NHSN?



Case 9



- 75 year old patient admitted for small bowel obstruction. 5/15 taken to OR and SB resection and appendectomy performed.
- What surgeries are recorded in NGSN?



Case 9



- How are the durations for the individual surgeries determined?

“



Case 9



- What if bilateral surgeries are recorded in NGSN? (ex bilat KPROs)
- How are the durations for the individual surgeries determined?



Bloodstream Infection Definitions

CDC

- **Laboratory confirmed bloodstream infection (LCBI)**
– all patients
 1. Any patient: ≥ 1 blood culture with pathogen
 2. Any patient: ≥ 2 blood cultures drawn on separate occasions positive with same skin organism + clinical symptoms
 3. Infant/neonate: ≥ 2 blood cultures drawn on separate occasions positive with same skin organism + clinical symptoms

LCBI – Criterion 1

CDC

**Patient has a recognized pathogen cultured from one or more blood cultures
and
organism cultured from blood is not related to an infection at another site.**



Example: Jon Smith had a PICC line inserted on admission (June 1). On hospital day 4, he became confused and experienced chills. Blood cultures were drawn which grew *E. faecalis*.

One or more blood cultures means that at least one bottle from a blood draw is reported by the laboratory as having grown organisms (i.e., is a positive blood culture).

Recognized pathogen does not include organisms considered common skin contaminants. A few of the recognized pathogens are *Staph aureus*, *Enterococcus* spp., *E. coli*, *Pseudomonas* spp., *Klebsiella* spp., *Candida* spp., etc.



LCBI – Criterion 2

Criterion 2: Patient has at least one of the following signs or symptoms: fever (>38°C), chills, or hypotension
and
 signs and symptoms and positive laboratory results are not related to an infection at another site
and
 common skin contaminant (i.e., diphtheroids [*Corynebacterium* spp.], *Bacillus* [not *B. anthracis*] spp., *Propionibacterium* spp., coagulase-negative staphylococci [including *S. epidermidis*], viridans group streptococci, *Aerococcus* spp., *Micrococcus* spp.) is cultured from two or more blood cultures drawn on separate occasions.



The phrase “two or more blood cultures drawn on separate occasions” means:

- 1. That blood from at least two blood draws were collected within two days of each other, and**
- 2. That at least one bottle from each blood draw is reported by the laboratory as having grown the same common skin contaminant organism (i.e., is a positive blood culture)**



Definition: CLABSI

- Central Line-Associated Bloodstream Infection (CLABSI) is a primary bloodstream infection (BSI) in a patient that had a central line *within* the 48-hour period before the development of the BSI
- If the BSI develops in a patient within 48 hours of discharge from a location, indicate the discharging location on the infection report

NOTE: There is no minimum time period that the central line must be in place in order for the BSI to be considered central line-associated.



Definition: Central Line

A vascular infusion device that terminates at or close to the heart or in one of the great vessels.

The following are considered great vessels for the purpose of reporting central line infections and counting central line days

- Aorta
- Pulmonary artery
- Superior vena cava
- Inferior vena cava
- Brachiocephalic veins
- Internal jugular veins
- Subclavian veins
- External iliac veins
- Common femoral veins



Case 10



- James is a 28 year old patient with a central line who is 3 days post colon surgery. He spikes a fever and has blood cultures x2 drawn; 1 set is negative, 1 bottle from the second set is positive for *Bacillus cereus*. His doctor orders antibiotics and notes “postop sepsis” in the chart.

How should this be reported?



Case 11



- A patient with a PICC placed in another facility has been in our hospital for the past week and now has a blood culture growing *Acinetobacter baumannii*.



Is this a BSI?

Is this a CLABSI?

Should it be attributed to our hospital or to the facility that placed the PICC?



Case 12



An 81 year old patient was in MICU for a week with a central line in place the entire time. Just prior to discharge from the MICU to a medical ward, the line was pulled. Within 36 hours, she became disoriented and hypotensive. Blood cultures x 2 were drawn and 3 of 4 bottles grew Micrococci and coagulase-negative staphylococci.

Is this a BSI?

Is this a CLABSI?

Location of attribution?

Organism(s)?

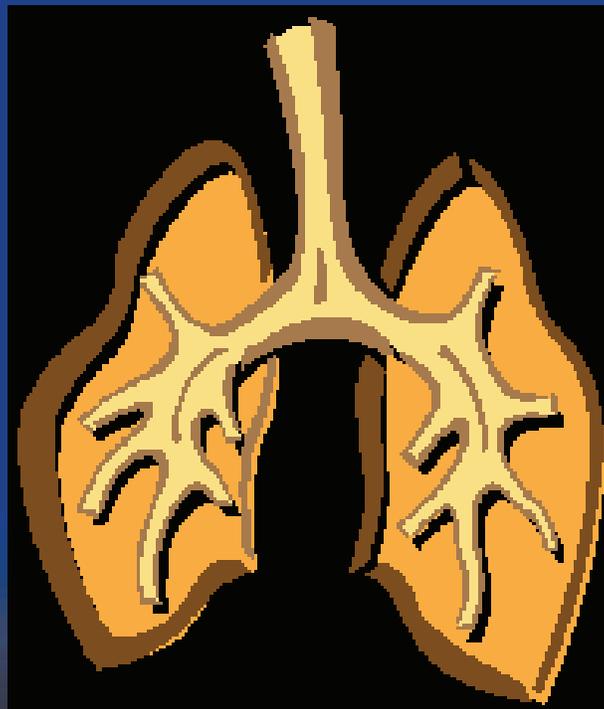


Case 13



- Patient admitted to MICU on 1/21 due to GI bleed
- L subclavian line placed on 1/22
- 1/28 patient spikes fever (102.1 F); blood specimen for culture drawn through the line x 1; line removed and tip sent for culture
- 1/30 blood and tip cultures positive for coagulase-negative staphylococci

Is this a CLABSI?



PNU1: Clinically Defined - Any Patient

X-Ray findings:

Patient **with underlying diseases** has **2 or more serial X-rays** with **one** of the following:

- New or progressive and persistent infiltrate
- Consolidation
- Cavitation
- Pneumatoceles, in ≤ 1 y.o.



OR

Patient **without underlying diseases** has **1 or more serial X-rays** with **one** of the following:

- New or progressive and persistent infiltrate
- Consolidation
- Cavitation
- Pneumatoceles, in ≤ 1 y.o.

AND



Reminder!

Always begin by reviewing chest xray findings.

PNU1: Clinically Defined - Any Patient

Signs and symptoms:

At least **one** of the following:

- Fever ($> 38^{\circ} \text{C} / 100.4^{\circ} \text{F}$) with no other cause
- Leukopenia ($< 4,000 \text{ WBC/mm}^3$) or leukocytosis ($\geq 12,000 \text{ WBC/mm}^3$)
- Altered mental status with no other cause, in ≥ 70 y.o.



AND

At least **two** of the following:

- New onset of purulent sputum, or change in character of sputum, or \uparrow respiratory secretions, or \uparrow suctioning requirements
- New onset or worsening cough, or dyspnea, or tachypnea
- Rales or bronchial breath sounds
- Worsening gas exchange (e.g., O_2 desats [e.g., $\text{PaO}_2/\text{FiO}_2 \leq 240$], $\uparrow \text{O}_2$ req, or \uparrow ventilation demand)

PNU2: Specific Laboratory Findings

X-ray criteria are exactly the same as for PNU1

Patient **with underlying diseases** has **2 or more serial X-rays** with **one** of the following:

- New or progressive and persistent infiltrate
- Consolidation
- Cavitation
- Pneumatoceles, in ≤ 1 y.o.

OR

Patient **without underlying diseases** has **1 or more serial X-rays** with **one** of the following:

- New or progressive and persistent infiltrate
- Consolidation
- Cavitation
- Pneumatoceles, in ≤ 1 y.o.

AND



PNU2 - Specific Laboratory Findings

Signs and symptoms:

At least **one** of the following:

- Fever ($> 38^{\circ}$ C/ 100.4° F) with no other cause
- Leukopenia ($< 4,000$ WBC/ mm^3) or leukocytosis ($\geq 12,000$ WBC/ mm^3)
- Altered mental status with no other cause, in ≥ 70 y.o.

AND

At least **one** of the following:

- New onset of purulent sputum, or change in character of sputum, or \uparrow respiratory secretions, or \uparrow suctioning requirements
- New onset or worsening cough, or dyspnea, or tachypnea
- Rales or bronchial breath sounds
- Worsening gas exchange (e.g., O_2 desats [e.g., $\text{PaO}_2/\text{FiO}_2 \leq 240$], $\uparrow \text{O}_2$ req, or \uparrow ventilation demand)



AND



PNU2 - Specific Laboratory Findings

Laboratory:

At least **one** of the following:

- Positive blood culture not related to another infection
- Positive pleural fluid culture
- Positive quantitative culture from minimally contaminated LRT specimen (e.g., BAL or protected specimen brushing)
- $\geq 5\%$ BAL-obtained cells contain intracellular bacteria on direct microscopic exam
- Histopathologic exam shows **one** of the following:
 - Abscess formation or foci of consolidation with intense PMN accumulation in bronchioles and alveoli
 - Positive quantitative culture of lung parenchyma
 - Evidence of lung parenchyma invasion by fungal hyphae or pseudohyphae

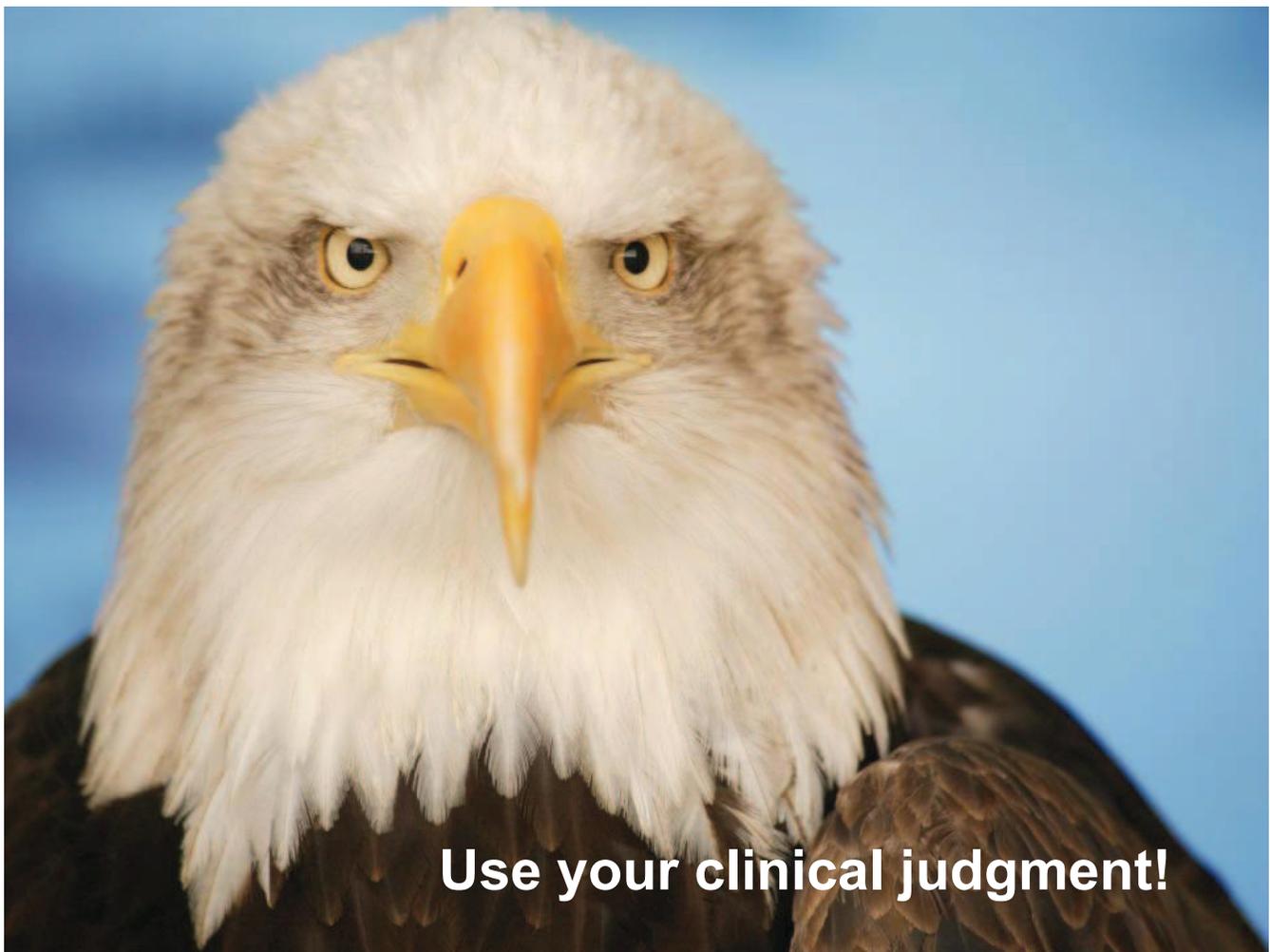
OR

At least **one** of the following:

- Positive culture of virus or *Chlamydia* from respiratory secretions
- Positive detection of viral antigen or antibody from respiratory secretions (e.g., EIA, FAMA, shell vial assay, PCR)
- 4-fold rise in paired sera (IgG) for pathogen (e.g., Influenza viruses, *Chlamydia*)
- Positive PCR for *Chlamydia* or *Mycoplasma*
- Positive micro-IF test for *Chlamydia*
- Positive culture or micro-IF of *Legionella* spp from respiratory secretions or tissue
- Detection of *Legionella pneumophila* serogroup 1 antigens in urine by RIA or EIA
- 4-fold rise in *L. pneumophila* antibody titer to $\geq 1:128$ in paired acute and convalescent sera by indirect IFA

Multiple Episodes in a Patient

- Can occur in critically ill patients with long stays
- Look for evidence of resolution of initial episode
- Addition of or change in pathogen alone not indicative
- New signs/symptoms and radiologic evidence needed



Use your clinical judgment!



Ventilator

- A device used to assist or control respiration continuously, inclusive of the weaning period, through a tracheostomy or endotracheal intubation
- Lung expansion devices are not considered ventilators (e.g., IPPB, CPAP, hypoCPAP) unless delivered via tracheostomy or endotracheal intubation (e.g., ET-CPAP)



Aspiration Pneumonia



- Gross aspiration upon intubation in the ED or by prehospital workers that leads to pneumonia is considered healthcare-associated
- Such a VAP is attributed to the inpatient location where the patient was assigned on the date the VAP was identified



Case 14



- Patient with cardiac arrest is intubated by first responders in the field; no evidence of witnessed aspiration
- Patient admitted to ICU on ventilator and on day 2 meets criteria for PNU1

Is this an HAI?

Is it a VAP?

Location of attribution?



Case 15



- Patient with end stage pancreatic cancer with liver & bone mets admitted to hospital with advance directive for comfort care and antibiotics only; peripheral IV and nasal cannula inserted
- Day 4: Patient is febrile (38.4); some difficulty breathing
- Day 5: CXR=infiltrate L lung base
- Day 7: WBC/mm³ = 3400; patchy infiltrates in both lung bases; continued episodes of dyspnea; rales noted in LLL
- Day 11: Patient expired



Case 15



- Does this patient have an HAI?
- What type?
- Ventilator-associated?



Case 16

CDC

- 62 y.o. male admitted through ED to MICU due to acute respiratory distress; H/O COPD and CAD; smoker x35 yrs, quit 3 yrs ago
- Day 1: Temp 99.3; nonpurulent cough; rhonchi in LLL and RLL; CXR – cardiomegaly with mild pulmonary edema; L subclavian line inserted; O₂ desats 96%; placed on a ventilator; NG tube feedings initiated; Foley catheter to direct drainage
- Day 2: Temp 100.6; CXR –no new findings; vent continued; urine cloudy



Case 16 (cont.)

CDC

- Day 3: Temp 101.2; frequent suctioning needed for thick, yellow secretions; CXR – diffuse airway disease LLL; rales noted RUL; protected BAL – specimen to lab for culture; empiric antibiotics started; vent continued; urine cloudy
- Day 4: Temp 100.9; suctioning frequently; CXR – no change; rales continue; urine clearer
- Day 5: Temp 100.9; BAL findings, $\geq 10^4$ CFU/ml *Acinetobacter baumannii*; antibiotics changed
- Day 10: Temp 99.4; much improved; CXR – RUL clearer; LLL unchanged from previous films



Case 16

- Does the patient have an HAI?
- Which site?
- Is it a VAP?



Case Study 17

- Adm day: Mr. Z, a trauma patient, is admitted from the ER to the SICU following an MVA. Intubated in the field, and the EMT reported vomitus below the vocal cords at the time of intubation. Foley and right subclavian catheter inserted
- Day 3: Post multiple ORIFs,
 - Severe edema present
 - Mechanical intubation continues
 - Fever of 100.8 °F



Case Study 17

- Day 4: WBC Increase to 16,000 cells/mm³. CXR shows multiple patchy infiltrates bilaterally
 - Blood, sputum and urine cultures sent
- Day 5: Vent settings increased
 - Blood cultures positive 2/3 gram positive cocci in pairs.
 - Urine culture negative
 - Antibiotics begun
- Day 6: Blood culture results: *Streptococcus pneumoniae*
 - Patient remains on ventilator
 - Crackles auscultated bilaterally



Case Study 17

- Day 7: Lung crackles continue bilaterally, condition unchanged
- ***Does this patient have an HAI?***
- No. Because vomitus was below the chords at the time of intubation, infection was incubating
 - Community-acquired pneumonia with secondary BSI



Case Study 18

- Adm day: 75 year old, male admitted for scheduled coronary artery bypass graft.
 - Intubated during surgery
 - Initial chest x-ray is clear
 - Post op stay in SICU is uncomplicated
- Day 2 He is extubated
- Day 3: He is transferred to the Step Down Unit
- Day 4: Joe develops fever to 101.5° F
 - Coughing large amounts of yellow colored sputum



Case Study 18

- Day 5: Repeat chest x-ray shows a new right lower infiltrate/atelectasis
 - Productive cough increasing
- Day 6: Continued area of increased density in right lower lobe
 - Antibiotics begun



Case Study 18

- Is the criteria for VAP met?
- If so, which set of criteria is met?
- What organism(s) would be assigned to this infection?



Case Study 18

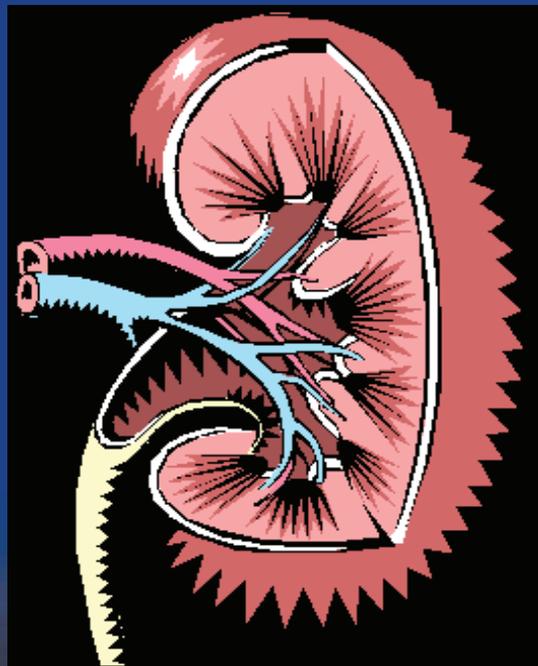
- What is the date of the VAP?
- To what unit is the VAP attributed?



Pneumonia Discussion

□ PNU 3

- For immunocompromised patients
- Signs and symptoms may be obscure
- Patients may become infected with organisms not commonly seen with immunocompetent individuals
 - *Candida spp*



Symptomatic UTI – 1a & 1b



Criterion	Symptomatic Urinary Tract Infection (SUTI) Must meet at least 1 of the following criteria:
1a	<p>Patient had an indwelling urinary catheter in place at the time of specimen collection <i>and</i> at least 1 of the following signs or symptoms with no other recognized cause: fever (>38°C), suprapubic tenderness, or costovertebral angle pain or tenderness <i>and</i> a positive urine culture of $\geq 10^5$ colony-forming units (CFU)/ml with no more than 2 species of microorganisms.</p> <p>-----OR-----</p> <p>Patient had indwelling urinary catheter <u>removed within the 48 hours prior</u> to specimen collection <i>and</i> at least 1 of the following signs or symptoms with no other recognized cause: fever (>38°C), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness <i>and</i> a positive urine culture of $\geq 10^5$ colony-forming units (CFU)/ml with no more than 2 species of microorganisms.</p>
1b	<p>Patient did <u>not</u> have an indwelling urinary catheter in place at the time of specimen collection nor within 48 hours prior to specimen collection <i>and</i> has at least 1 of the following signs or symptoms with no other recognized cause: fever (>38°C) in a patient that is ≤ 65 years of age, urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness <i>and</i> a positive urine culture of $\geq 10^5$ CFU/ml with no more than 2 species of microorganisms.</p>

Symptomatic UTI – 2a



Patient had an indwelling urinary catheter in place at the time of specimen collection
and
at least 1 of the following signs or symptoms with no other recognized cause:
fever (>38°C), suprapubic tenderness, or costovertebral angle pain or tenderness
and
a positive urinalysis demonstrated by at least 1 of the following findings:

- positive dipstick for leukocyte esterase and/or nitrite
- pyuria (urine specimen with ≥ 10 white blood cells [WBC]/mm³ or ≥ 3 WBC/high power field of unspun urine)
- microorganisms seen on Gram stain of unspun urine

and
a positive urine culture of $\geq 10^3$ and $< 10^5$ CFU/ml with no more than 2 species of microorganisms.

-----OR-----

Patient had indwelling urinary catheter removed within the 48 hours prior to specimen collection
and
at least 1 of the following signs or symptoms with no other recognized cause:
fever (>38°C), urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness
and
a positive urinalysis demonstrated by at least 1 of the following findings:

- positive dipstick for leukocyte esterase and/or nitrite
- pyuria (urine specimen with ≥ 10 white blood cells [WBC]/mm³ or ≥ 3 WBC/high power field of unspun urine)
- microorganisms seen on Gram stain of unspun urine

and
a positive urine culture of $\geq 10^3$ and $< 10^5$ CFU/ml with no more than 2 species of microorganisms.



Symptomatic UTI – 2b



Patient did not have an indwelling urinary catheter in place at the time of specimen collection nor within 48 hours prior to specimen collection

and

has at least 1 of the following signs or symptoms with no other recognized cause: fever ($>38^{\circ}\text{C}$) in a patient that is ≤ 65 years of age, urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness

and

a positive urinalysis demonstrated by at least 1 of the following findings:

- a. positive dipstick for leukocyte esterase and/or nitrite
- b. pyuria (urine specimen with ≥ 10 WBC/mm³ or ≥ 3 WBC/high power field of unspun urine)
- c. microorganisms seen on Gram stain of unspun urine

and

a positive urine culture of $\geq 10^3$ and $< 10^5$ CFU/ml with no more than 2 species of microorganisms.

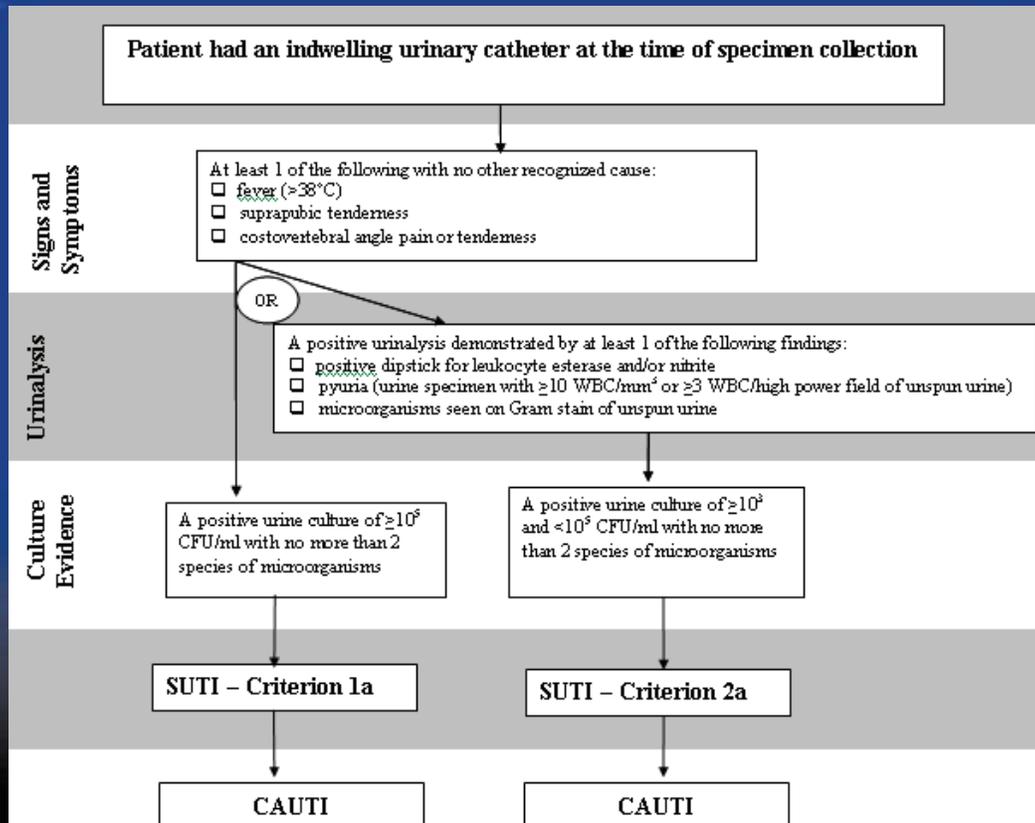


SUTI for ≤ 1 year olds – Criteria 3 & 4



3	<p>Patient ≤ 1 year of age with or without an indwelling urinary catheter has at least 1 of the following signs or symptoms with no other recognized cause: fever ($>38^{\circ}\text{C}$ core), hypothermia ($<36^{\circ}\text{C}$ core), apnea, bradycardia, dysuria, lethargy, or vomiting</p> <p><i>and</i></p> <p>a positive urine culture of $\geq 10^5$ CFU/ml with no more than 2 species of microorganisms.</p>
4	<p>Patient ≤ 1 year of age with or without an indwelling urinary catheter has at least 1 of the following signs or symptoms with no other recognized cause: fever ($>38^{\circ}\text{C}$ core), hypothermia ($<36^{\circ}\text{C}$ core), apnea, bradycardia, dysuria, lethargy, or vomiting</p> <p><i>and</i></p> <p>a positive urinalysis demonstrated by at least one of the following findings:</p> <ul style="list-style-type: none"> a. positive dipstick for leukocyte esterase and/or nitrite b. pyuria (urine specimen with ≥ 10 WBC/mm³ or ≥ 3 WBC/high power field of unspun urine) c. microorganisms seen on Gram's stain of unspun urine <p><i>and</i></p> <p>a positive urine culture of between $\geq 10^3$ and $< 10^5$ CFU/ml with no more than two species of microorganisms.</p>

SUTI 1a & 2a Catheter in Place Flow Diagram



Asymptomatic Bacteremic UTI (ABUTI)



Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)

Patient with or without an indwelling urinary catheter has no signs or symptoms (i.e., no fever ($>38^{\circ}\text{C}$) for patients ≤ 65 years of age*; and for any age patient no urgency, frequency, dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness, OR for a patient ≤ 1 year of age, no fever ($>38^{\circ}\text{C}$ core), hypothermia ($<36^{\circ}\text{C}$ core), apnea, bradycardia, dysuria, lethargy, or vomiting)

and

a positive urine culture of $\geq 10^5$ CFU/ml with no more than 2 species of uropathogen microorganisms**

and

a positive blood culture with at least 1 matching uropathogen microorganism to the urine culture.

*Fever is not diagnostic for UTI in the elderly (>65 years of age) and therefore fever in this age group does not disqualify from meeting the criteria of an ABUTI.

**Uropathogen microorganisms are: Gram-negative bacilli, *Staphylococcus* spp., yeasts, beta-hemolytic *Streptococcus* spp., *Enterococcus* spp., *G. vaginalis*, *Aerococcus urinae*, and *Corynebacterium* (urease positive).



Case 19



- Patient with end stage pancreatic cancer with liver & bone mets admitted to hospital with advance directive for comfort care & antibiotics only
 - Peripheral IV and nasal cannula inserted
- Day 4: patient is febrile and has suprapubic tenderness
 - IV ampicillin started after urine culture obtained
- Day 5: difficulty breathing
 - CXR=infiltrate L lung base
- Day 6: urine culture results = 10^5 CFU/ml *E coli*
- Day 7: WBC/mm³ = 3400; patchy infiltrates in both lung bases;
- Episodes of dyspnea, rales noted in LLL
- Day 11: Patient expired



Case 19



- Does this patient have an HAI?
- What type?
- Device associated?



Case 20

- POD 3: 66 y.o. patient in the ICU with a Foley catheter s/p exploratory lap; patient noted to be febrile (38.9) and complained of diffuse abdominal pain
- WBC increased to 19,000. He had cloudy, foul-smelling urine and urinalysis showed 2+ protein, + nitrite, 2+ leukocyte esterase, wbc – TNTC, and 3+ bacteria. Culture was 10,000 CFU/ml *E. coli*. The abdominal pain was secondary to his surgery.

Is this a UTI?



Case 21

- 84 year old patient is hospitalized with GI bleed
- Day 3: Patient has catheter in place and no signs or symptoms of infection
- Day 9: Patient becomes unresponsive, is intubated and CBC shows WBC of 15,000. Afebrile. Patient is pan-cultured. Blood culture and urine both grow *Streptococcus pyogenes* – urine $>10^5$ CFU/ml.

Is this a UTI?



Case 22

- 3 week old infant born at 27 weeks gestation. Umbilical catheter in place. HR 100, RR 32, and core temperature ranges between 96.5 and 95.8 . Straight cath urine culture yields $>10^5$ CFU/ml *Staphylococcus epidermidis*.
- 1 blood culture sent same day, also positive for *S. epi*. No susceptibilities provided.

Is this a UTI?



Collecting Summary Data

- NHSN Protocol for the collection of device-associated infection denominators:
 - Patient Days: at the same time every day count the number of patients on the unit
 - Device Days: at the same time every day, count the number of patients with one or more devices

Collecting Summary Data



- MICU – collecting patient days and device days on June 8 at noon

Patient	ADT	Vascular	Urinary	Respiratory
101 Smith	Home @ 9 am	PICC home w/ pt	Indwelling foley to DD	O2 @2L/min cont
102 Washington	Day 3	Peripheral IV	Bedpan – cath spec to lab	IPPB q 6 hours
103 Doe	Adm 10 am	IJ CL inserted at 2 pm	Voiding	O2 @ 2L/min prn
104 -----				
105 Chen	Day 2	Swan Ganz and PICC	Suprapubic to direct drainage	Intubated/vent
106 Jones	Day 8	Subclavian CL cont	Indwelling foley to DD	Trach / vent
107 Gonzales	D/C to nursing home @ 4 pm	Peripheral line d/c at 1 pm	Incontinent	Suctioned prn

Collecting Summary Data



How many patient days are counted for this MICU on June 8?

- A. 7
- B. 6
- C. 5
- D. 4
- E. 3

Patient	ADT
101 Smith	Home @ 9 am
102 Washington	Day 3
103 Doe	Adm 10 am
104 -----	
105 Chen	Day 2
106 Jones	Day 8
107 Gonzales	D/C to nursing home @ 4 pm



Collecting Summary Data

How many central line days?

- A. 6
- B. 5
- C. 3
- D. 2
- E. 0

Patient	ADT	Vascular
101 Smith	Home @ 9 am	PICC home w/ pt
102 Washington	Day 3	Peripheral IV
103 Doe	Adm 10 am	IJ CL inserted at 2 pm
104 -----		
105 Chen	Day 2	Swan Ganz and PICC
106 Jones	Day 8	Subclavian CL cont
107 Gonzales	D/C to nursing home @ 4 pm	Peripheral line d/c at 1 pm



Collecting Summary Data

How many indwelling catheter days?

- A. 6
- B. 5
- C. 4
- D. 3
- E. 2
- F. 1

Patient	ADT	Urinary
101 Smith	Home @ 9 am	Indwelling foley to DD
102 Washington	Day 3	Bedpan – cath spec to lab
103 Doe	Adm 10 am	Voiding
104 -----		
105 Chen	Day 2	Suprapubic to direct drainage
106 Jones	Day 8	Indwelling foley to DD
107 Gonzales	D/C to nursing home @ 4 pm	Incontinent



Collecting Summary Data

How many ventilator days?

- A. 5
- B. 4
- C. 3
- D. 2
- E. 1

Patient	ADT	Respiratory
101 Smith	Home @ 9 am	O2 @2L/min cont
102 Washington	Day 3	IPPB q 6 hours
103 Doe	Adm 10 am	O2 @ 2L/min prn
104 -----		
105 Chen	Day 2	Intubated/vent
106 Jones	Day 8	Trach / vent
107 Gonzales	D/C to nursing home @ 4 pm	Suctioned prn



MDRO Module

- MDRO module can be used with “Big Four” surveillance modules
 - SSI, BSI, UTI & VAP
- Several ways to use:
- LabID event and Infection Surveillance most commonly used
- LabID- most simple and uses laboratory data – *estimate only*
- Infection Surveillance- tracks clinical infection



MDRO/CDAD Reporting

- Required:
 - Infection SurveillanceOR
 - LabID Event
- Optional:
 - Prevention Process Measures
 - Adherence to Hand Hygiene
 - Adherence to Gown and Glove Use
 - Adherence to Active Surveillance Testing
 - Active Surveillance Testing Outcomes Measures



MDRO Case Study

- Your facility's NHSN February 2010 monthly plan states you are following in your ICUs:
 - BSI
 - VAP
 - MDRO
 - Infection Surveillance
 - Lab ID Event



MDRO Case Study

- Patient is admitted to the hospital on February 1 for a CBGB
 - Central line placed in surgery
- After surgery, patient transfers to the Cardiac ICU
- On February 5 patient spikes a intermittent fevers for the next 3 days
 - Elevated WBC are noted in am of February 6 & 7th



MDRO Case Study

- Positive blood cultures on February 6th
 - Taken from central line and peripheral site
 - Both cultures positive for MRSA as the pathogen
- What to do?



MDRO Case Study



- Does this patient have an NHSN HAI?
- If so, what type?



MDRO Case Study



- What is followed within MDRO?
- Lab ID Event?
- Infection Surveillance Event?

What forms are completed?



Forms to complete, con't.



Resources



This is the NHSN new NSHN Website:

<http://www.cdc.gov/nhsn>

- The NHSN data collection forms are here
- Gov Delivery allows immediate notice of updates or changes to NHSN
- Manual and all teaching tools are available to all

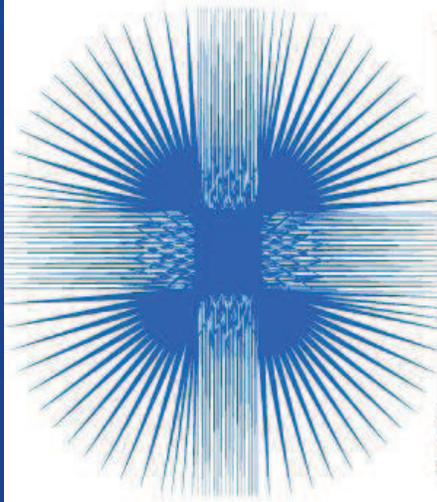
APIC Text of Infection Control and Epidemiology chapters (www.apic.org)

- Surveillance
- Comparing rates
- Principles of Infection Prevention

References



- AJIC: American Journal of Infection Control, Volume 36, Issue 5, Pages 309-332, June 2008, Teresa C. Horan; Mary Andrus; Margaret A. Dudeck. [www.ajicjournal.org/article/S0196-6553\(08\)00167.../abstract](http://www.ajicjournal.org/article/S0196-6553(08)00167.../abstract)
- Lee TB, Montgomery OG, Marx J, Olmsted RN, Scheckler, WE. Recommended practices for surveillance 2007;35(7):427-440.



NHSN

National Healthcare
Safety Network

nhsn@cdc.gov