Definitions and Surveillance for Healthcare Associated Infections (HAIs) in Long-term Care

Evelyn Cook, RN, CIC
Associate Director SPICE

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How confident are you that your facility has a strong infection prevention program that includes all the necessary elements?

A. Completely confident

B. Somewhat confident

C. Not confident

D. Have NO idea

2

Do you believe you have the skills and the qualifications to oversee the infection prevention program?

A. Yes

B. No

C. No way; No how

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If you wanted to compare your IP surveillance data to another NH in your community that cared for a similar resident population, how confident are you that events will be tracked the same way?

A. Very confident
B. Slightly confident
C. Not confident at all
D. Not sure if I can compare my own data from one year to the next

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What standardized definition does your facility use for surveillance?

A. National Healthcare Safety Network (NHSN)
B. Revised McGeer Definitions
C. Loeb Criteria
D. When the physician documents an infection
E. No standardized criteria
F. A and B

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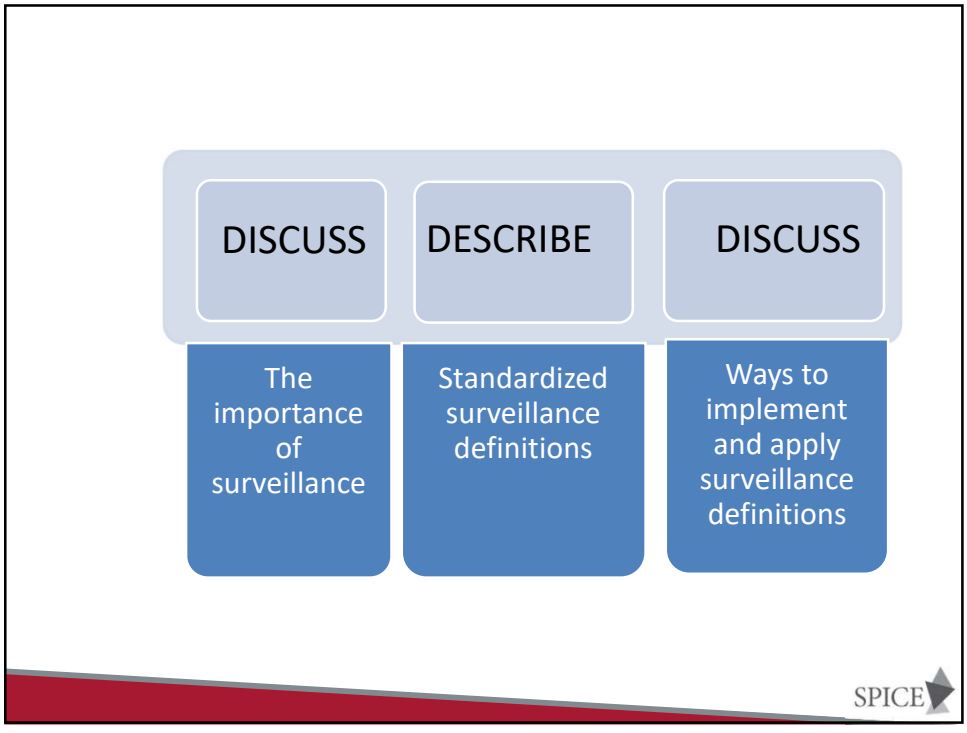

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- "Surveillance is a comprehensive method of measuring outcomes and related processes of care, analyzing the data, and providing information to members of the healthcare team to assist in improving those outcomes and processes (APIC Text)
- "Surveillance system must include "**routine, ongoing**, and **systematic collection**, **analysis,** interpretation, and **dissemination** of surveillance data to identify infections (i.e., HAI and communicable-acquired), infection risks, communicable disease outbreaks and to maintain or improve resident health status:" (CMS 2/23)

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Rationale for Conducting Surveillance

- One of the most important aspects of an IP's responsibilities
- Should cover residents, staff, contractors (in the facility) and visitors
- 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

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Types of Surveillance

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

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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

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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

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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	

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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

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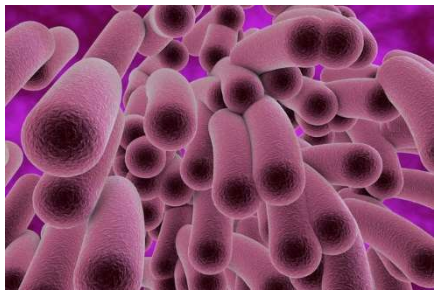
Selection of Processes and Outcomes

Processes

- Hand hygiene
- Urinary Catheter insertion/maintenance

Outcomes

- Acute respiratory infections
- Urinary tract infections
- Skin/Soft Tissue Infections
- Gastroenteritis



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Consideration for Choosing Outcome Measures

- Mandatory/required-Cat 1C
- *Frequency (incidence) of the infection
- *Communicability
- *System/resident cost (↑mortality, hospitalization)
- *Early Detection

Based on the Infection Prevention risk assessment

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Should be included in routine surveillance

Points to Consider	Infections	Comments
Evidence of transmissibility in a healthcare setting	Viral respiratory tract infections, viral GE, and viral conjunctivitis	Associated with outbreaks among residents and HCP in LTCFs
Processes available to prevent acquisition of infection, i.e., HH compliance		
Clinically significant cause of morbidity or mortality	Pneumonia, UTI, GI tract infections, (including C. *difficile)* and SSTI	Associated with hospitalization and functional decline in LTCF residents
Specific pathogens causing serious outbreaks	Any invasive group A *Streptococcus* infection, acute viral hepatitis, norovirus, scabies, influenza-**COVID-19, *C auris***	A single laboratory-confirmed case should prompt further investigation

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Infections that could be included in routine surveillance

Points to Consider	Infections	Comments
Infections with limited transmissibility in a healthcare settings	Ear and sinus infections, fungal oral and skin infections and herpetic skin infections	Associated with underlying comorbid conditions and reactivation of endogenous infection
Infections with limited preventability		

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Infections for which other accepted definitions should be applied in LTCF surveillance

Points to Consider	Infections	Comments
Infections with other accepted definitions (may apply to only specific at-risk residents)	Surgical site infections, central-line- associated bloodstream infections and ventilator-associated pneumonia	LTCF-specific definitions were not developed. Refer to the National Healthcare Safety Network's criteria

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Sources of Data for Surveillance

- Clinical ward/unit rounds
- Medical Chart
- Lab reports
- Kardex/Patient Profile/Temperature logs
- Antibiotic Starts
- IT support

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Surveillance

- ***The facility's surveillance system must include a <u>data collection tool</u> and the use of nationally-recognized <u>surveillance criteria</u> such as but not limited to, the CDC's National Healthcare Safety Network (NHSN) Long Term Care Criteria to define infections or revised McGeer criteria***

State Operations Manual
Appendix PP - Guidance to Surveyors for Long Term Care Facilities
Table of Contents
(Rev. 02-03-2023)

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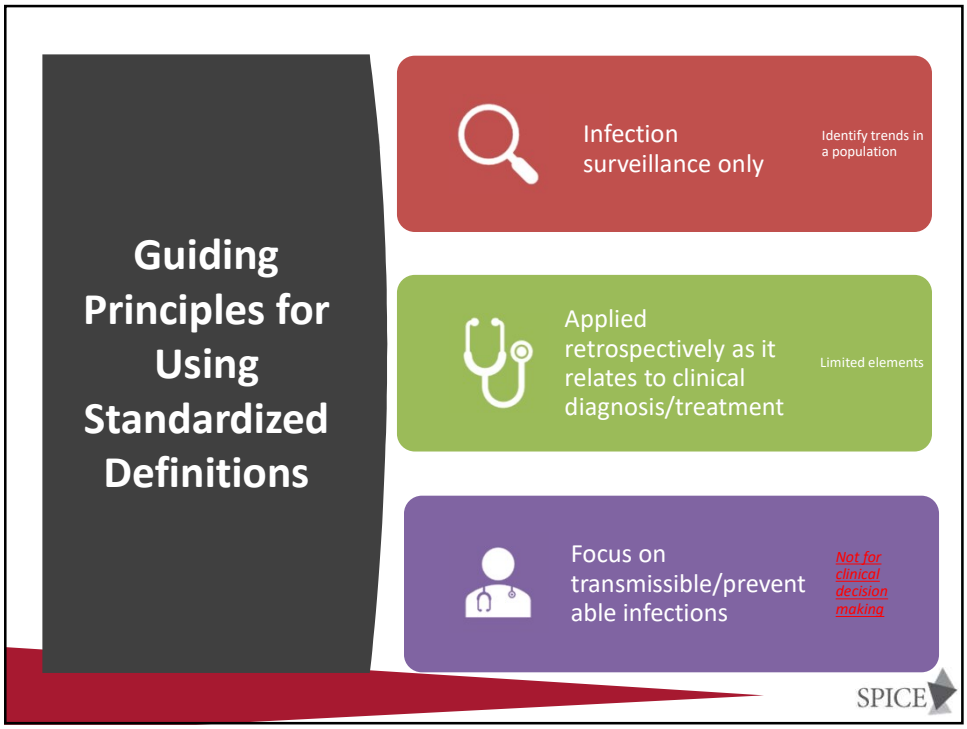
Guiding Principles for Using Standardized Definitions
Infection surveillance only
Identify trends in a population
Applied retrospectively as it relates to clinical diagnosis/treatment
Limited elements
Focus on transmissible/preventable infections
Not for clinical decision making
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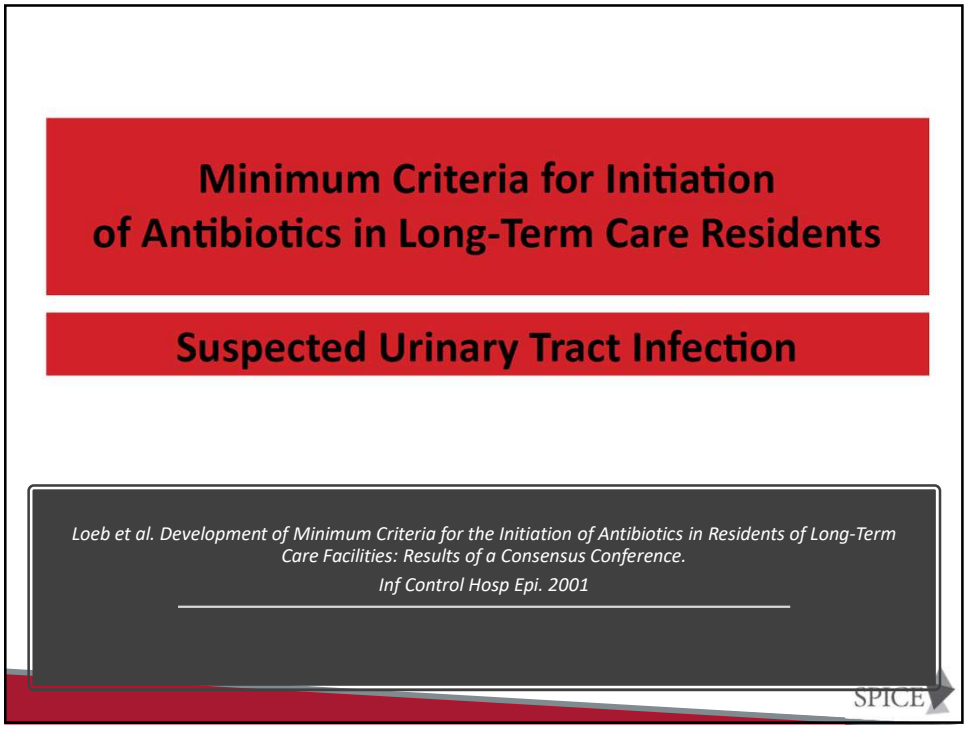
Minimum Criteria for Initiation of Antibiotics in Long-Term Care Residents
Suspected Urinary Tract Infection
Loeb et al. Development of Minimum Criteria for the Initiation of Antibiotics in Residents of Long-Term Care Facilities: Results of a Consensus Conference.
Inf Control Hosp Epi. 2001
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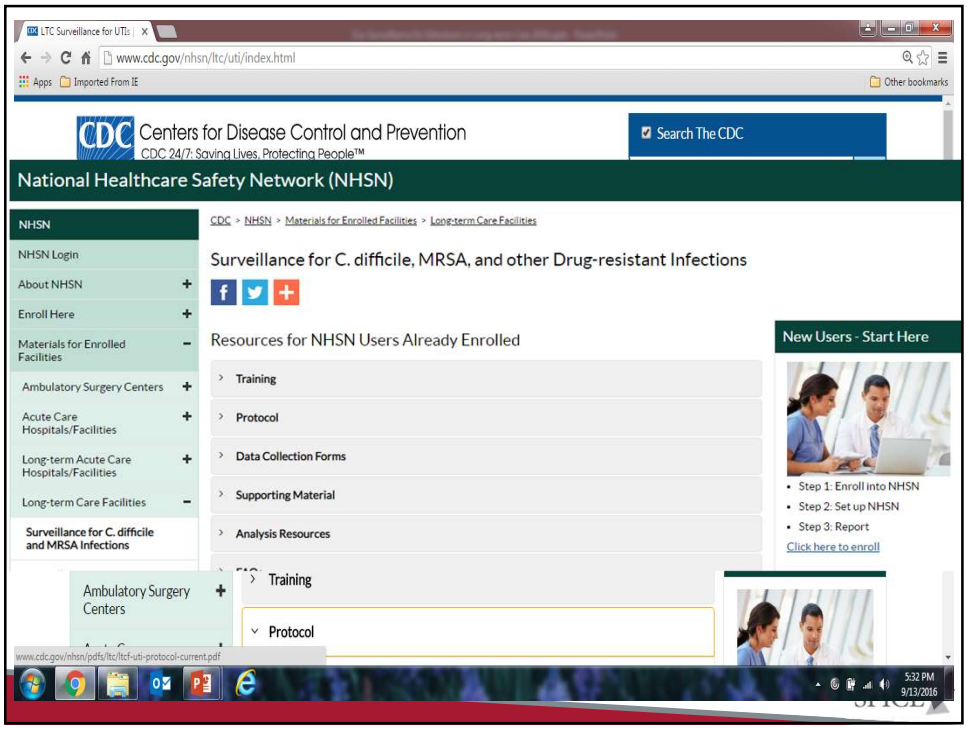

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Purposes of NHSN

- Provide facilities with risk-adjusted data that can be used for inter-facility comparisons and local quality improvement activities
- Assist facilities in developing surveillance and analysis methods that permit timely recognition of patient and healthcare personnel safety problems and prompt intervention with appropriate measures
- Conduct collaborative research studies with members
- Data repository for reporting healthcare associated infections, COVID-19 infections, COVID vaccinations and certain process measures

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INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY OCTOBER 2012, VOL. 33, NO. 10

SHEA/CDC POSITION PAPER

Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the McGeer Criteria

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for the Society for Healthcare Epidemiology Long-Term Care Special Interest Group*

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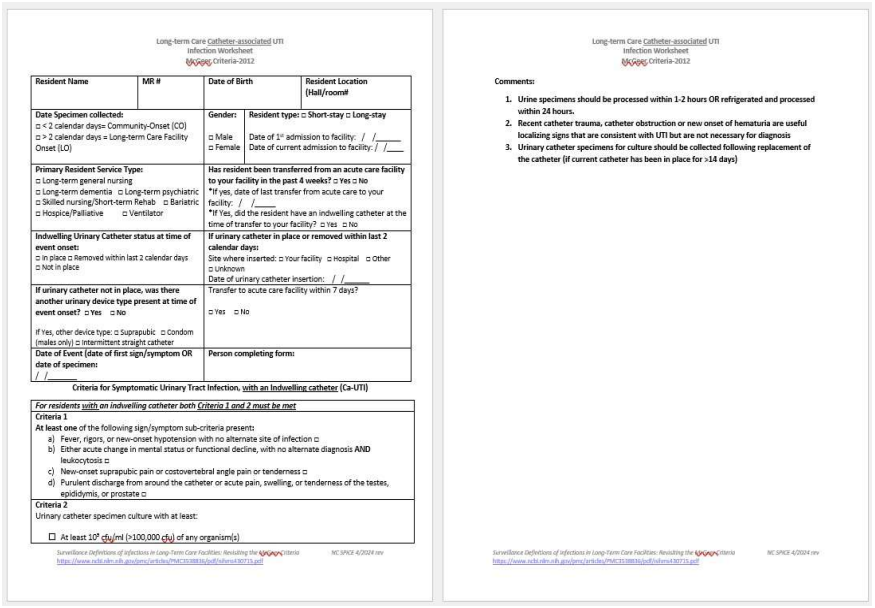

Long-term Care Catheter-associated UTI
Infection Worksheet
NHSN Criteria-2012

Resident Name	MR #	Date of Birth	Resident Location (Hall/room#
Date Specimen collected: □ < 2 calendar days= Community-Onset (CO) □ > 2 calendar days = Long-term Care Facility Onset (LO)		**Gender:** □ Male □ Female	**Resident type:** □ Short-stay □ Long-stay Date of 1st admission to facility: / /____ Date of current admission to facility: / /____
Primary Resident Service Type: □ Long-term general nursing □ Long-term dementia □ Long-term psychiatric □ Skilled nursing/Short-term Rehab □ Bariatric □ Hospice/Palliative □ Ventilator		**Has resident been transferred from an acute care facility to your facility in the past 4 weeks?** □ Yes □ No *If yes, date of last transfer from acute care to your facility: / /____ *If Yes, did the resident have an indwelling catheter at the time of transfer to your facility? □ Yes □ No	
Indwelling Urinary Catheter status at time of event onset: □ In place □ Removed within last 2 calendar days □ Not in place		**If urinary catheter in place or removed within last 2 calendar days:** Site where inserted: □ Your facility □ Hospital □ Other □ Unknown Date of urinary catheter insertion: / /____	
If urinary catheter not in place, was there another urinary device type present at time of event onset? □ Yes □ No If Yes, other device type: □ Suprapubic □ Condom (males only) □ Intermittent straight catheter		Transfer to acute care facility within 7 days? □ Yes □ No	
Date of Event (date of first sign/symptom OR date of specimen: / /____		**Person completing form:**	

Criteria for Symptomatic Urinary Tract Infection, with an Indwelling catheter (Ca-UTI)

For residents with an indwelling catheter both Criteria 1 and 2 must be met
Criteria 1 **At least one** of the following sign/symptom sub-criteria present: a) Fever, rigors, or new-onset hypotension with no alternate site of infection □ b) Either acute change in mental status or functional decline, with no alternate diagnosis **AND** leukocytosis □ c) New-onset suprapubic pain or costovertebral angle pain or tenderness □ d) Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate □
Criteria 2 Urinary catheter specimen culture with at least: ☐ At least 10^5 cfu/ml (>100,000 cfu) of any organism(s)

Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the NHSN Criteria NC SPICE 4/2024 rev
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3108836/pdf/nihms430715.pdf

Long-term Care Catheter-associated UTI
Infection Worksheet
NHSN Criteria-2012

Comments:

1. **Urine specimens should be processed within 1-2 hours OR refrigerated and processed within 24 hours.**
2. **Recent catheter trauma, catheter obstruction or new onset of hematuria are useful localizing signs that are consistent with UTI but are not necessary for diagnosis**
3. **Urinary catheter specimens for culture should be collected following replacement of the catheter (if current catheter has been in place for >14 days)**

Surveillance Definitions of Infections in Long-Term Care Facilities: Revisiting the NHSN Criteria NC SPICE 4/2024 rev
https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3108836/pdf/nihms430715.pdf

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Attribution of infection to LTCF

- No evidence of an incubating infection at the time of admission to the facility
  - Basis of clinical documentation of appropriate signs and symptoms and not solely on screening microbiologic data
- Onset of clinical manifestation occurs > 2 calendar days after admission.

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Attribution of infection to LTCF

- All symptoms must be new or acutely worse
- Non-infectious causes of signs and symptoms should always be considered prior to diagnosis
- Identification of an infection should not be based on a single piece of evidence
  - Clinical, microbiologic, radiologic
- Diagnosis by physician insufficient (based on definition)

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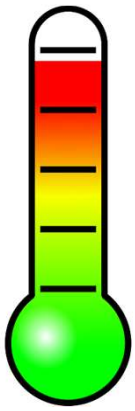
Constitutional Requirements

Fever:

- A single oral temperature >37.8°C [100°F], OR
- Repeated oral temperatures >37.2°C [99°F]; rectal temperature >37.5° (99.5°F) OR
- >1.1°C [2°F] over baseline from a temperature taken at any site



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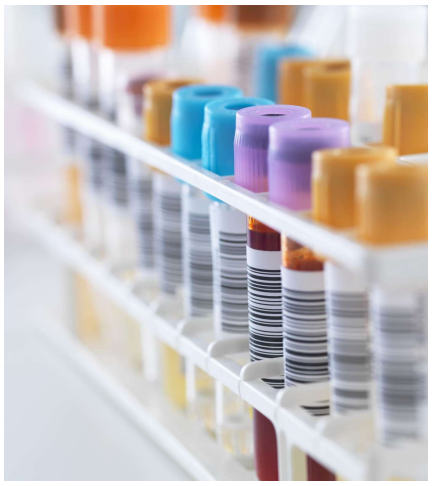
Constitutional Requirements

Leukocytosis

- Neutrophilia > 14000 WBC/mm^3

OR

- Left shift (>6% bands or ≥1500 bands/mm^3)



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Constitutional Requirements

Acute Change in Mental Status from Baseline

- Based on Confusion Assessment Method (CAM) criteria available in MDS

Change	Criteria	
Acute Onset	Evidence of acute change in mental status from resident baseline	
Fluctuating	Behavior fluctuating (e.g., coming and going or changing in severity during assessment)	
Inattention	Resident has difficulty focusing attention (e.g., unable to keep track of discussion or easily distracted	
Disorganized Thinking	Resident's thinking is incoherent (e.g., rambling conversation, unclear flow of ideas)	Either /or
Altered level of consciousness	Resident's level of consciousness is described as different from baseline (e.g., hyperalert, sleepy, drowsy, difficult arouse, nonresponsive)	

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Constitutional Requirements

Acute Functional Decline

- New 3-point increase in total ADL score (0-28) from baseline based on 7 ADLs {0 = independent; 4 = total dependence}
  1. Bed mobility
  2. Transfer
  3. Locomotion within LTCF
  4. Dressing
  5. Toilet use
  6. Personal hygiene
  7. Eating

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Site Specific Definitions

Knowledge Checks

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Respiratory Tract Infections

Criteria	Comments
A. Common cold syndrome/pharyngitis At least **two** criteria present 1. Runny nose or sneezing 2. Stuffy nose (i.e., congestion) 3. Sore throat or hoarseness or difficulty swallowing 4. Dry cough 5. Swollen or tender glands in neck	Fever may or may not be present. Symptoms must be new, and not attributable to allergies

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Respiratory Tract Infections

Criteria	Comments
B. Influenza-like Illness **Both** criteria 1 and 2 present 1. Fever 2. At least **three** of the following symptom sub-criteria (a-f) present a. Chills b. New headache or eye pain c. Myalgias or body aches d. Malaise or loss of appetite e. Sore throat f. New or increased dry cough	If criteria for influenza-like illness and another upper or lower respiratory tract infection are met at the same time, only the diagnosis of influenza-like illness should be used Due to increasing uncertainty surrounding the timing of the start of influenza season, the peak of influenza activity and the length of the season, 'seasonality' is no longer part of the criteria to define influenza-like illness

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Respiratory Tract Infections

Criteria	Comments
C. Pneumonia	For both pneumonia and lower respiratory tract infections, presence of underlying conditions which could mimic a respiratory tract infection presentation (congestive heart failure, interstitial lung disease), should be excluded by review of clinical records and an assessment of presenting symptoms and signs
All criteria 1-3 present	
1. Interpretation of chest radiograph as demonstrating pneumonia or the presence of new infiltrate	
2. At least **one** of the following respiratory sub-criteria (a-f) present	
a. New or increased cough	
b. New or increased sputum production	
c. O_2 saturation <94% on room air or a reduction in O_2 saturation of more than 3% from baseline	
d. New or changed lung exam abnormalities	
e. Pleuritic chest pain	
f. Respiratory rate of ≥ 25/min	
3. At least **one** constitutional criteria	

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Respiratory Tract Infections

Criteria	Comments
D. Lower respiratory tract (Bronchitis or Tracheo-bronchitis	For both pneumonia and lower respiratory tract infections, presence of underlying conditions which could mimic a respiratory tract infection presentation (congestive heart failure, interstitial lung disease), should be excluded by review of clinical records and an assessment of presenting symptoms and signs
All criteria 1-3 present	
1. Chest radiograph not performed or *negative* for pneumonia or new infiltrate.	
2. At least **two** of the following respiratory sub-criteria (a-f) present	
a. New or increased cough	
b. New or increased sputum production	
c. O_2 saturation <94% on room air or a reduction in O_2 saturation of more than 3% from baseline	
d. New or changed lung exam abnormalities	
e. Pleuritic chest pain	
f. Respiratory rate of ≥ 25/min	
3. At least **one** constitutional criteria	

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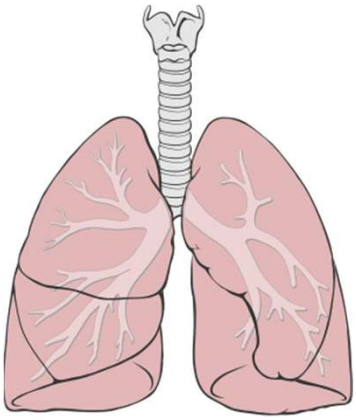

Knowledge Check

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Knowledge Check #1

Mr. Do Little has multiple co-morbidities including hypertension and acute respiratory failure. Vitals on admission WNL

On day seven after admission, the daughter tells the nurse “dad is not responding like he used to. He can not hold a conversation, tires easily and is not able to brush his teeth, eat or dress without assistance.” **I think he has a UTI. He needs an antibiotic.**

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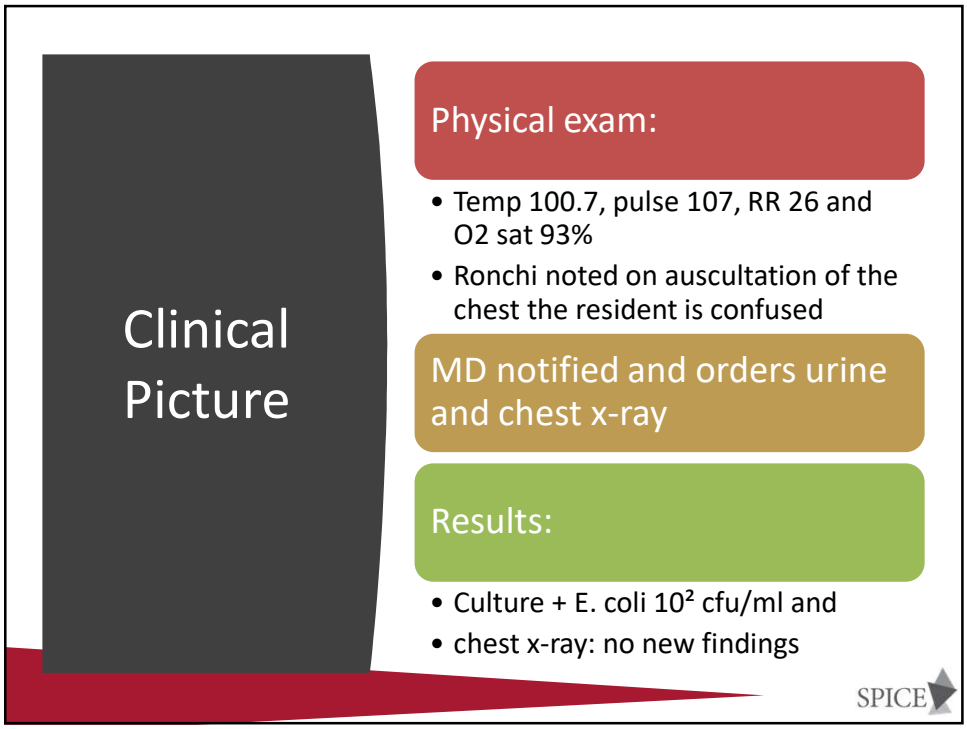

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Does Mr. Do Little have an infection?

- Yes
- No
- Have no idea

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What surveillance criteria are met?

A. Common Cold
B. Pneumonia
C. Urinary tract infection
D. Lower respiratory track

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If Yes, is it facility or community associated?

- Facility
- Community

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Respiratory Tract Infections

Criteria	Comments
D. Lower respiratory tract (Bronchitis or Tracheo-bronchitis	
All criteria 1-3 present 1. Chest radiograph not performed or *negative* for pneumonia or new infiltrate. 2. At least **two** of the following respiratory sub-criteria (a-f) present a. New or increased cough b. New or increased sputum production c. O_2 saturation <94% on room air or a reduction in O_2 saturation of more than 3% from baseline d. New or changed lung exam abnormalities e. Pleuritic chest pain f. Respiratory rate of ≥ 25/min 3. At least **one** constitutional criteria	For both pneumonia and lower respiratory tract infections, presence of underlying conditions which could mimic a respiratory tract infection presentation (congestive heart failure, interstitial lung disease), should be excluded by review of clinical records and an assessment of presenting symptoms and signs

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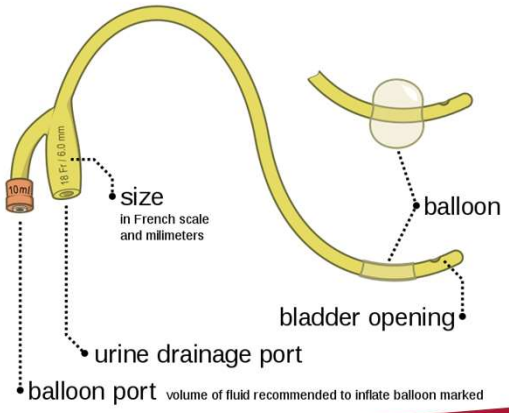
WHAT ABOUT URINARY TRACT INFECTIONS



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What do the Guidelines Say?

- Insert catheters only for appropriate indications
- Avoid use of urinary catheters in patients and nursing home residents for management of incontinence
- Keep the catheter and collecting tube free from kinking
- Empty the drainage bag regularly using a separate, clean collecting container for each resident (even in semi-private rooms)

- ***Changing indwelling catheters or drainage bags at routine, fixed intervals is not recommended.*** It is suggested to change catheters and drainage bags based on clinical indications such as infection, obstruction, or when the closed system has been compromised

https://www.cdc.gov/infectioncontrol/guidelines/cauti/index.html

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Urinary Specimens: What do the Guidelines Say?

- Specimens collected through the catheter present for more than a few days reflect biofilm microbiology.
- For residents with chronic indwelling catheters **(greater than 14 days)** and symptomatic infection, changing the catheter immediately prior to instituting antimicrobial therapy allows collection of a bladder specimen, which is a more accurate reflection of infecting organisms.
- Urinary catheters coated with antimicrobial materials have the potential to decrease UTIs but have not been studied in the LTCF setting.

SHEA/APIC Guideline: Infection prevention and control in the long-term care facility Philip W. Smith, MD, Gail Bennett, RN, MSN, CICb Suzanne Bradley, MD, Paul Drinka, MD, Ebbing Lautenbach, MD, James Marx, RN, MS, CIC, Lona Mody, MD, Lindsay Nicolle, MD and Kurt Stevenson, MD July 2008

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McGeer Urinary Tract Infections

without catheter

Criteria	Comments
A. For Residents without an indwelling catheter Both criteria 1 and 2 present 1. At **least one** of the following sign/symptom sub-criteria (a-c) present: a) Acute dysuria or acute pain, swelling, or tenderness of the testes, epididymis, or prostate b) Fever or leukocytosis and At least one of the following localizing urinary tract sub-criteria: i. Acute costovertebral angle pain or tenderness ii. Suprapubic pain iii. Gross hematuria iv. New or marked increase in incontinence v. New or marked increase in urgency vi. New or marked increase in frequency c) In the absence of fever of leukocytosis, then at least two or more of the following localizing urinary symptoms i. Suprapubic pain ii. Gross hematuria iii. New or marked increase in incontinence iv. New or marked increase in urgency v. New or marked increase in frequency 2. One of the following microbiologic sub-criteria a) At least 10^5 cfu/ml of no more than 2 species of microorganisms in a voided urine b) At least 10^2 cfu/ml of any number of organisms in a specimen collected by an in and out catheter	UTI should be diagnosed when there are localizing s/s and a positive urinary culture ***A diagnosis of UTI can be made without localizing symptoms if a blood culture isolate of the same organism isolated from the urine and there is no alternate sight of infection*** In the absence of a clear alternate source, fever or rigors with a positive urine culture in a non-catheterized resident will often be treated as a UTI. However, evidence suggest most of these episodes are not from a urinary source Pyuria does not differentiate symptomatic UTI from asymptomatic bacturia Absence of pyuria in diagnostic test excludes symptomatic UTI in residents of LTCF Urine specimens should be processed within 1-2 hours, or refrigerated and processed with in 24 hours.

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McGeer Urinary Tract Infections

Criteria	Comments
B. For the resident with an indwelling catheter **Both** criteria 1 and 2 present 1. At least **one** of the following sign/symptom sub-criteria (a-d) present: a) Fever, rigors, or new onset hypotension, with no alternate site of infection b) Either acute change in mental status or acute functional decline with no alternate diagnosis and Leukocytosis c) New onset suprapubic pain or costovertebral angle pain or tenderness d) Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate 2. Urinary catheter culture with at least 10^5 cfu/ml of any organism(s)	Recent catheter trauma, catheter obstruction or new onset hematuria are useful localizing signs consistent with UTI, but not necessary for diagnosis Urinary catheter specimens for culture should be collected following the replacement of the catheter (if current catheter has been in place for >14 days)

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NHSN Notes

- Indwelling urinary catheter should be in place for a minimum of 2 calendar days before infection onset (day 1 = day of insertion)
- Indwelling urinary catheter: a drainage tube that is inserted into the urinary bladder through the urethra, is left in place and is connected to a closed collection system, also called a foley catheter. Indwelling urinary catheters do not include straight in-and-out catheters or suprapubic catheters (these would be captures as SUTIs, not CA-SUTIs)
- *Indwelling catheters which have been in place for > 14 days should be changed prior to specimen collection but failure to change catheter does not exclude a UTI for surveillance purposes*

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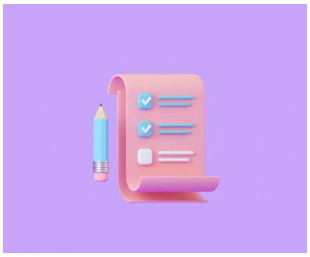
NHSN Key Reminders

1. ***"Mixed flora" is not available in the pathogen list within NHSN.*** Therefore, it cannot be reported as a pathogen to meet the NHSN UTI criteria. Additionally, "mixed flora" often represents contamination and likely represents presence of multiple organisms in culture (specifically, at least two organisms).

2. ***Yeast and other microorganisms, which are not bacteria, are not acceptable UTI pathogens***, and therefore, cannot be used to meet NHSN UTI criteria without the presence of a qualifying bacterium.

3. To remove the subjectivity about whether a fever is attributable to a UTI event, ***the presence of a fever, even if due to another cause (for example, pneumonia), must still be counted as a criterion when determining if the NHSN UTI definition is met.***



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NHSN Urinary Tract Infections For Residents without an indwelling catheter

Must meet Criteria 1,2 OR 3

Criteria 1

One of the following true:

1. Acute dysuria
2. Acute pain, swelling or tenderness of the testes, epididymis or prostate

AND

A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml

Criteria 2

Either of the following:

1. Fever: (Single temperature >100° F or >99° F on repeated occasions (more than once) OR an increase of >2° F over baseline
2. Leukocytosis: >10,000 cells/mm³ or left shift (6% or 1, 500 bands/mm³

AND

One or more of the following (**New or Marked increase**):

1. Costovertebral angle pain or tenderness
2. Suprapubic tenderness
3. Visible (Gross) hematuria
4. Incontinence
5. Urgency
6. Frequency

AND

A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/m

Criteria 3

Two or more of the following **(New and/or marked increase):**

1. Costovertebral angle pain or tenderness
2. Incontinence
3. Urinary urgency
4. Urinary frequency
5. Suprapubic tenderness
6. Visible (gross) hematuria

AND

A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml

Comments: Fever can be used to meet SUTI criteria even if the resident has another possible cause for the fever (for example, pneumonia

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NHSN Urinary Tract Infections

For the resident with an indwelling catheter-or removed within 2 calendar days prior to the event onset (day of catheter removal is day 1)

Criteria	Comments
CA-SUTI **One or more** of the following (Signs and Symptoms and Laboratory and diagnostic Testing): a) *Fever (Single temperature >100° F or >99° F on repeated occasions OR an increase of >2° F over baseline) b) Rigors c) New onset hypotension, with no alternate noninfectious cause d) New onset confusion/functional decline **with no alternate diagnosis AND** Leukocytosis (>10,000 cells/mm³ or left shift (6% or 1, 500 bands/mm³) e) New or marked increase in costovertebral angle pain or tenderness f) New or marked increase in suprapubic tenderness g) Acute pain, swelling, or tenderness of the testes, epididymis, or prostate h) Purulent discharge from around the catheter insertion site i) Acute dysuria (used only if catheter removed)	**AND** ↓ A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml **Fever can be used to meet CA-SUTI criteria even if the resident has another possible cause for the fever (for example, pneumonia)*

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Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)

Resident with or without an indwelling urinary catheter:

1. No qualifying fever or signs or symptoms (specifically no urinary urgency, urinary frequency, acute dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness). If no catheter is in place, fever alone would not exclude ABUTI if other criteria are met

AND

2. A positive urine culture with no more than 2-species of microorganisms, at least one of which is a bacterium of $\geq 10^5$ CFU/ml

AND

3. A positive blood culture with at least 1 matching bacteria to the urine culture

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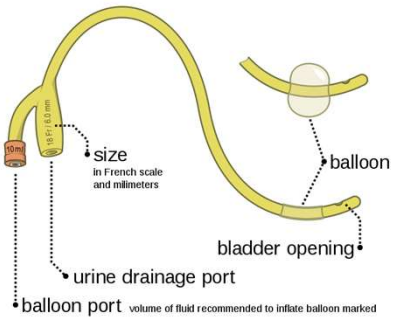
Knowledge Check



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Knowledge Check # 1

1 Mar.

Mrs. Ross is a resident in your facility, admitted on February 1st. An indwelling urinary catheter was inserted on March 1st.

5 Mar.

On March 5, the nurse practitioner documented that Mrs. Ross complained of suprapubic pain.

6 Mar.

The following day, on March 6, a specimen collected from the Foley catheter was sent to the lab and subsequently tested positive for greater than 100,000 CFU/ml of E. coli and 100,000 CFU/ml of Candida

SPICE

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Does Mr. Ross have a UTI?

A. Yes

B. No

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If Yes, is it catheter associate?

A. No

B. Yes

What criteria are met?

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McGeer Urinary Tract Infections

Criteria	Comments
B. ***For the resident with an indwelling catheter***	
Both criteria 1 and 2 present	Recent catheter trauma, catheter obstruction or new onset hematuria are useful localizing signs consistent with UTI, but not necessary for diagnosis
1. At least **one** of the following sign/symptom sub-criteria (a-d) present:	
a) Fever, rigors, or new onset hypotension, with no alternate site of infection	
b) Either acute change in mental status or acute functional decline with no alternate diagnosis and Leukocytosis	
c) **New onset suprapubic pain or** costovertebral angle pain or tenderness ✓	Urinary catheter specimens for culture should be collected following the replacement of the catheter (if current catheter has been in place for >14 days)
d) Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate	
2. **Urinary catheter culture with ≥10^5 cfu/ml of any organism(s)** ✓	

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NHSN Urinary Tract Infections

For the resident with an indwelling catheter ✓

Criteria	Comments
CA-SUTI	
One or more of the following (Signs and Symptoms and Laboratory and diagnostic Testing):	**AND** ↓
a) *Fever (Single temperature >100° F or >99° F on repeated occasions OR an increase of >2° F over baseline)	**A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of ≥10^5 CFU/ml** ✓
b) Rigors	
c) New onset hypotension, with no alternate site of infection	
d) New onset confusion/functional decline **AND** Leukocytosis (>14,000 cells/mm^3 or left shift (6% or 1, 500 bands/mm^3)	
e) New or marked increase in costovertebral angle pain or tenderness	
f) New or marked increase in suprapubic tenderness ✓	**Fever can be used to meet CA-SUTI criteria even if the resident has another possible cause for the fever (for example, pneumonia)*
g) Acute pain, swelling, or tenderness of the testes, epididymis, or prostate	
h) Purulent discharge from around the catheter	

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Knowledge Check # 2

Mr. U, a resident of LTC facility has a urinary catheter in place for 3 days for acute urinary retention. Later that day he spikes a fever of 101°F and has a cough with shortness of breath.

The physician orders a urine culture, and it comes back positive with >100,000 CFU/ml of Pseudomonas aeruginosa and Candida albicans.

Upon further work, up Mr. U is determined not to have any other symptoms that meet the NHSN CA-SUTI criteria,

§ But, a chest X-ray does show infiltrates in the right upper lobe of the lung.

SPICE

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Does Mr. U have an infection?

A. Yes

B. No

What type of infection does Mr. U have?

1. Pneumonia
2. Catheter Associated UTI
3. UTI but no catheter

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McGeer Urinary Tract Infections

Criteria	Comments
B. *For the resident with an indwelling catheter*	
Both criteria 1 and 2 present	
1. At least **one** of the following sign/symptom sub-criteria (a-d) present:	Recent catheter trauma, catheter obstruction or new onset hematuria are useful localizing signs consistent with UTI, but not necessary for diagnosis
a) **Fever**, rigors, or new onset hypotension, with no alternate site of infection ✓	
b) Either acute change in mental status or acute functional decline with no alternate diagnosis and Leukocytosis	
c) New onset suprapubic pain or costovertebral angle pain or tenderness	
d) Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate	Urinary catheter specimens for culture should be collected following the replacement of the catheter (if current catheter has been in place for >14 days)
2. **Urinary catheter culture with ≥10^5 cfu/ml of any organism(s)** ✓	

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NHSN Urinary Tract Infections

For the resident with an indwelling catheter ✓ **> 2 days**

Criteria	Comments
CA-SUTI	
One or more of the following (Signs and Symptoms and Laboratory and diagnostic Testing): ✓	**AND**
a) ***Fever (Single temperature >100° F** or >99° F on repeated occasions OR an increase of >2° F over baseline)	**A positive urine culture with no more than 2 species of microorganisms, at least one of which is a bacterium of ≥10^5 CFU/ml** ✓
b) Rigors	
c) New onset hypotension, with no alternate site of infection	
d) New onset confusion/functional decline **AND** Leukocytosis (>14,000 cells/mm³ or left shift (6% or 1, 500 bands/mm³)	
e) New or marked increase in costovertebral angle pain or tenderness	
f) New or marked increase in suprapubic tenderness	
g) Acute pain, swelling, or tenderness of the testes, epididymis, or prostate	
h) Purulent discharge from around the catheter	

**Fever can be used to meet CA-SUTI criteria even if the resident has another possible cause for the fever (for example, pneumonia)*

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Respiratory Tract Infections

Criteria	Comments
C. Pneumonia	
All criteria 1-3 present	
1. Interpretation of chest radiograph as demonstrating **pneumonia or the presence of new infiltrate** ✓	For both pneumonia and lower respiratory tract infections, presence of underlying conditions which could mimic a respiratory tract infection presentation (congestive heart failure, interstitial lung disease), should be excluded by review of clinical records and an assessment of presenting symptoms and signs
2. At least **one** of the following respiratory sub-criteria (a-f) present	
a. New or increased cough ✓	
b. New or increased sputum production	
c. O_2 saturation <94% on room air or a reduction in O_2 saturation of more than 3% from baseline	
d. New or changed lung exam abnormalities	
e. Pleuritic chest pain	
f. Respiratory rate of ≥ 25/min	
3. At least one constitutional criteria ✓	

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Knowledge Check # 3

Day 1: Ms. R had an indwelling urinary catheter inserted for a bladder outlet obstruction

Day 2: The indwelling urinary catheter remains in place

Day 3: The resident's indwelling urinary catheter remains in place. The resident had a single oral temp of 100.2°F. A urine culture was collected from the catheter

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Ms. R continued

Day 4: The indwelling urinary catheter remains in place. No symptoms documented

Day 5: The urine culture was positive for Candida glabrata 10^5 CFU/ml

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Does Ms. R have an infection?

A. Yes

B. No

What type of infection does Ms. R have?

1. Catheter Associated UTI
2. UTI but no catheter

Which definition is met?

1. NHSN
2. McGeer
3. Both

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McGeer Urinary Tract Infections

Criteria	Comments
B. For the resident with an indwelling catheter ✓ **Both** criteria 1 and 2 present 1. At least **one** of the following sign/symptom sub-criteria (a-d) present: a) **Fever, rigors, or new onset hypotension, with no alternate site of infection** ✓ b) Either acute change in mental status or acute functional decline with no alternate diagnosis and Leukocytosis c) New onset suprapubic pain or costovertebral angle pain or tenderness d) Purulent discharge from around the catheter or acute pain, swelling, or tenderness of the testes, epididymis, or prostate 2. **Urinary catheter culture with ≥10^5 cfu/ml of any organism(s)** ✓	Recent catheter trauma, catheter obstruction or new onset hematuria are useful localizing signs consistent with UTI, but not necessary for diagnosis Urinary catheter specimens for culture should be collected following the replacement of the catheter (if current catheter has been in place for >14 days)

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Knowledge Check # 4

Mrs. C is an 85-year-old female who is normally ambulatory, independent of ADLs and very social with staff and other residents. She has been a resident of your facility for 10 years

This morning, March 5th, Mrs. C seems confused, refuses breakfast, is incontinent of stool and does not want to get out of bed.

Vital Signs: Temp 99.5, RR 22, O^2Sat 93% on room air and BP is 110/70. Urine is dark yellow and has a strong odor.

Physician orders, UC, BC and chest x-ray

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Knowledge Check # 4

Diagnostic test are completed, and results are as follows:

UC positive for >10^5 cfu/ml of *klebsiella pneumonia and* > 10^2 *candida albicans*

Chest x-ray negative for infiltrate

BC + for *Klebsiella pneumonia*

What Surveillance Definition Does Mrs. C meet?

1. Lower respiratory tract
2. Gastroenteritis
3. Urinary tract infection
4. Bloodstream infection
5. Asymptomatic Bacteremic Urinary Tract Infection

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Asymptomatic Bacteremic Urinary Tract Infection (ABUTI)

Resident with or without an indwelling urinary catheter:

1. No qualifying fever or signs or symptoms (specifically no urinary urgency, urinary frequency, acute dysuria, suprapubic tenderness, or costovertebral angle pain or tenderness). If no catheter is in place, fever alone would not exclude ABUTI if other criteria are met

AND

2. A positive urine culture with no more than 2-species of microorganisms, at least one of which is a bacterium of ≥ 10^5 CFU/ml

AND

3. A positive blood culture with at least 1 matching bacteria to the urine culture

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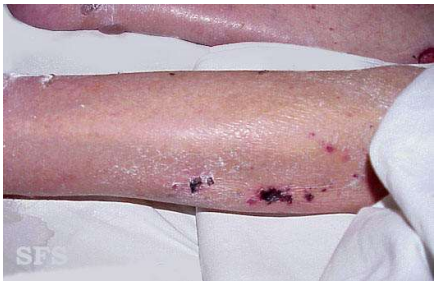
Skin, Soft Tissue and Mucosal Infections



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Skin, Soft Tissue and Mucosal Infections

Criteria	Comments
A. Cellulitis/soft tissue/wound infection At least **one** of the following criteria is present 1. Pus present at a wound, skin, or soft tissue site 2. New or increasing presence of at least **four** of the following sign/symptom sub-criteria a) Heat at affected site b) Redness at affected site c) Swelling at affected site d) Tenderness or pain at affected site e) Serous drainage at affected site **f) One** constitutional criteria	More than one resident with streptococcal skin infection from the same serogroup (e.g., A, B, C, G) in a LTCF may suggest an outbreak For wound infections related to surgical procedures: LTCF should use the CDC's NHSN surgical site infection criteria and report these infections back to the institution performing the original surgery Presence of organisms cultured from the surface (e.g., superficial swab culture) of a wound is not enough evidence that the wound is infected

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Skin, Soft Tissue and Mucosal Infections

Criteria	Comments
B. Scabies	Care must be taken to rule out rashes due to skin irritation, allergic reactions, eczema, and other non-infectious skin conditions
Both criteria 1 and 2 present 1. A maculopapular and/or itching rash 2. At least **one** of the following sub-criteria: a) Physician diagnosis b) Laboratory confirmation (scrapping or biopsy) c) Epidemiologic linkage to a case of scabies with laboratory confirmation	An epidemiologic linkage to a case can be considered if there is evidence of geographic proximity in the facility, temporal relationship to the onset of symptoms, or evidence of a common source of exposure (i.e., shared caregiver).

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Skin, Soft Tissue and Mucosal Infections

Criteria	Comments
C. Fungal oral/perioral and skin infections	Mucocutaneous candida infections are usually due to underlying clinical conditions such as poorly controlled diabetes or severe immunosuppression. Although not transmissible infections in the healthcare setting, they can be a marker for increased antibiotic exposure
Oral candidiasis: **Both** criteria 1 and 2 present: 1. Presence of raised white patches on inflamed mucosa, or plaques on oral mucosa 2. Medical or dental provider diagnosis	
Fungal skin Infection: **Both** criteria 1 and 2 present: 1. Characteristic rash or lesion 2. Either a medical provider diagnosis or laboratory confirmed fungal pathogen from scrapping or biopsy	Dermatophytes have been known to cause occasional infections, and rare outbreaks, in the LTC setting.

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Skin, Soft Tissue and Mucosal Infections

Criteria	Comments
D. Herpes viral skin infections Herpes simplex infection **Both** criteria 1 and 2 present: 1. A vesicular rash 2. Either physician diagnosis or laboratory confirmation Herpes zoster infection **Both** criteria 1 and 2 present: 1. A vesicular rash 2. Either physician diagnosis or laboratory confirmation	Reactivation of old herpes simplex ("cold sores") or herpes zoster ("shingles") is not considered a healthcare-associated infection Primary herpes viral skin infections are very uncommon in LTCF, except in pediatric populations where it should be considered healthcare-associated.

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Skin, Soft Tissue and Mucosal Infections

Criteria	Comments
E. Conjunctivitis At least **one** of the following criteria present: 1. Pus appearing from one or both eyes, present for at least 24 hours 2. New or increasing conjunctival erythema, with or without itching. 3. New or increased conjunctival pain, present for at least 24 hours.	Conjunctivitis symptoms ("pink eye") should not be due to allergic reaction or trauma.

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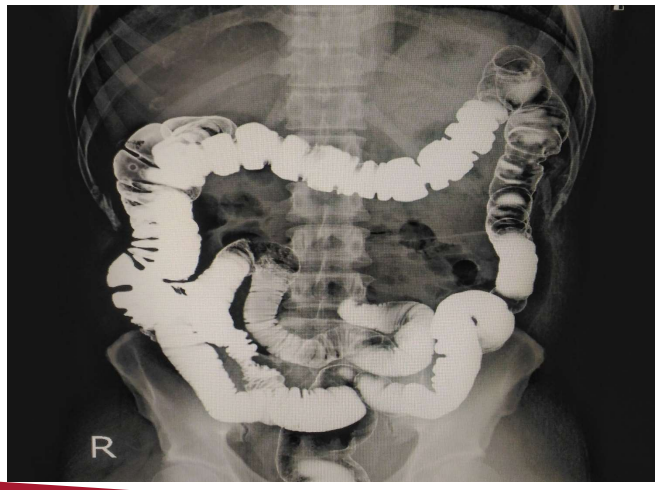
Gastrointestinal Tract Infections



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Gastrointestinal Tract Infections

Criteria	Comments
A. Gastroenteritis At **least one** of the following criteria present 1. Diarrhea, three or more liquid or watery stools above what is normal for the resident within a 24-hour period 2. Vomiting, two or more episodes in a 24-hour period 3. Both of the following sign/symptom sub-criteria present: a) A stool specimen positive for a pathogen (such as Salmonella, Shigella, E. coli 0157:H7, Campylobacter species, rotavirus) b) At least one of the following GI sub-criteria present i. Nausea ii. Vomiting iii. Abdominal pain iv. Diarrhea	Care must be taken to exclude non-infectious causes of symptoms. For instance, new medication may cause diarrhea, nausea/vomiting; initiation of new enteral feeding may be associated with diarrhea; nausea or vomiting may be associated with gallbladder disease. Presence of new GI symptoms in a single resident may prompt enhanced surveillance for additional cases. In the presence of an outbreak, stool from specimens should be sent to confirm the presence of norovirus, or other pathogens (such as rotavirus and E. coli 0157:H7).

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Gastrointestinal Tract Infections

Criteria	Comments
B. Norovirus gastroenteritis Both criteria 1 and 2 present 1. At least one of the following GI sub-criteria a) Diarrhea, three or more liquid or watery stools above what is normal for the resident within a 24-hour period b) Vomiting, two or more episodes in a 24-hour period 2. A stool specimen positive for detection of norovirus either by electron microscopy, enzyme immune assay, or by a molecular diagnostic test such as polymerase chain reaction (PCR).	**In the absence of laboratory confirmation, an outbreak (2 or more cases occurring in a LTCF) of acute gastroenteritis due to norovirus infection in a LTCF may be assumed to be present if all of the following criteria are present ("Kaplan criteria")** **a) Vomiting in more than half of affected persons** **b) A mean (or median) incubation period of 24-48 hours** **c) A mean (or median) duration of illness of 12-60 hours** **d) No bacterial pathogen is identified in stool culture.**

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Criteria	Comments
C. Clostridium difficile gastroenteritis **Both** criteria 1 and 2 present **1. One** of the following GI sub-criteria a) Diarrhea, three or more liquid or watery stools above what is normal for the resident within a 24-hour period b) The presence of toxic megacolon (abnormal dilation of the large bowel documented on radiology) **2. One** of the following diagnostic sub-criteria a) The stool sample yields a positive laboratory test result for *C. difficile* toxin A or B, or a toxin-producing *C. difficile* organism is identified in a stool culture or by a molecular diagnostic test such as PCR b) Pseudomembranous colitis is identified during endoscopic examination or surgery, or in histopathologic examination of a biopsy specimen.	A **"primary episode"** of *C. difficile* infection (CDI) is defined as one that has occurred without any previous history of CDI., or that has occurred more than 8 weeks after the onset of a previous episode of CDI. A **"recurrent episode"** of CDI is defined as an episode of CDI that occurs 8 weeks or less after the onset of previous episode, provided the symptoms from the earlier (previous) episode resolved Individuals previously infected with *C. difficile* may continue to remain colonized even after symptoms resolve In the setting of a GI outbreak, individuals could test positive for *C. difficile* toxin due to ongoing colonization and be co-infected with another pathogen. It is important that other surveillance criteria are used to differentiate infections in this situation.

Gastrointestinal Tract Infections

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CDI LabID Event (*different than an infection*)

- *C. difficile* positive laboratory assay, tested on a loose-unformed stool specimen, and collected while a resident is receiving care from the LTCF, and the resident has no prior *C. difficile* positive laboratory assay collected in the previous two weeks (<14 days) while receiving care from the LTCF

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Why is *C. difficile* Surveillance Important?

C. difficile is the leading cause of acute diarrhea in nursing home residents

C. difficile infections contribute to approximately 14,000 deaths/year

~ 90% elderly

Prevention activities, like antimicrobial stewardship programs and hand hygiene are shown to prevent the spread of *C. difficile* and other infections

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SETTING OF NOROVIRUS OUTBREAKS REPORTED THROUGH THE NATIONAL OUTBREAK REPORTING SYSTEM (NORS), 2009-2012

Exposure setting	Number of Outbreaks	Percentage of Outbreaks
Health care facility	2189	62.7%
Restaurant or banquet facility	771	22.1%
School or day-care facility	214	6.1%
Private residence	69	1.9%
Other/multiple settings	251	7.2%

Data on specific settings are restricted to outbreaks with a single exposure setting; for foodborne outbreaks, setting refers to the setting where implicated food was consumed.

https://www.cdc.gov/norovirus/images/settings-lg.jpg

Knowledge Check

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Knowledge Check # 1

Mrs. Hammer is admitted to your facility for rehab after having hip replacement surgery at the local hospital. While in the hospital she received treatment for *C. difficile* infection

Two weeks later, resident complains that she has had multiple episodes of vomiting and diarrhea

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Ms. Hammer

The nurse remembers that this is the 8th such case of diarrhea and vomiting and that the resident's roommate had similar symptoms 2 days ago.

When completing the line listing of infected cases, the following data was noted:

6/8 residents had vomiting	5/8 residents had diarrhea	Most symptoms occurred within 48 hours of each other	Symptoms lasted on average of 36 hours (range 24-48 hrs)

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What type of infection does Ms. Hammer have?

A. *C. difficile*

B. Gastroenteritis

C. Norovirus

D. Just an upset stomach

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Gastrointestinal Tract Infections

Criteria	Comments
B. Norovirus gastroenteritis **Both** criteria 1 and 2 present 1. At least **one** of the following GI sub-criteria a) Diarrhea, three or more liquid or watery stools above what is normal for the resident within a 24 hour period b) Vomiting, two or more episodes in a 24 hour period 2. A stool specimen positive for detection of norovirus either by electron microscopy, enzyme immune assay, or by a molecular diagnostic test such as polymerase chain reaction (PCR).	In the absence of laboratory confirmation, an outbreak (2 or more cases occurring in a LTCF) of acute gastroenteritis due to norovirus infection in a LTCF may be assumed to be present if **all** of the following criteria are present ("Kaplan criteria") a) Vomiting in more than half of affected persons b) A mean (or median) incubation period of 24-48 hours c) A mean (or median) duration of illness of 12-60 hours d) No bacterial pathogen is identified in stool culture.

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Gastrointestinal Tract Infections

Criteria	Comments
A. Gastroenteritis At least **one** of the following criteria present 1. Diarrhea, three or more liquid or watery stools above what is normal for the resident within a 24-hour period 2. Vomiting, two or more episodes in a 24-hour period **3. Both** of the following sign/symptom sub-criteria present: a) A stool specimen positive for a pathogen (such as *Salmonella, Shigella, E. coli* 0157:H7, *Campylobacter* species, rotavirus) b) At least **one** of the following GI sub-criteria present i. Nausea ii. Vomiting iii. Abdominal pain iv. Diarrhea	Care must be taken to exclude non-infectious causes of symptoms. For instance, new medication may cause diarrhea, nausea/vomiting; initiation of new enteral feeding may be associated with diarrhea; nausea or vomiting may be associated with gallbladder disease. Presence of new GI symptoms in a single resident may prompt enhanced surveillance for additional cases. In the presence of an outbreak, stool from specimens should be sent to confirm the presence of norovirus, or other pathogens (such as rotavirus and *E. coli* 0157:H7).

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Questions?

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