

# **Surveillance for Urinary Tract Infections (UTI)**

January 2018

# Objectives

- **At the end of this session, participants will be able to:**
  - Describe key terms and case definitions used in UTI surveillance
  - Complete UTI infection and denominator reporting forms
  - Conduct basic analysis of UTI surveillance data
  - Correctly apply case definition to identify UTI cases

# Surveillance case definitions vs. clinical diagnoses

- ❑ **Surveillance case definitions may not always align with clinical diagnoses**
  - Surveillance case definitions are used to identify trends in a population
  - Clinical diagnoses are used to identify and treat disease in an individual patient
  
- ❑ **Clinical judgment should not be used to “overrule” the reporting of cases that meet the surveillance case definition**

## Surveillance case definitions vs. clinical diagnoses

- ❑ A patient in your ICU has had an indwelling Foley catheter in place for 5 days. She develops fever and dysuria, and a urine culture grows *Candida albicans*, *Klebsiella pneumoniae*, *Enterococcus faecium*, and *Lactobacillus sp.*
- ❑ This episode does not meet UTI the surveillance case definition. The ICU physician believes that this is a catheter-associated UTI and wants you to report the case to the surveillance network. How would you respond?

## Surveillance case definitions vs. clinical diagnoses

- ❑ A patient in your ICU has had an indwelling Foley catheter in place for 5 days. She develops fever and dysuria, and a urine culture grows *Candida albicans*, *Klebsiella pneumoniae*, *Enterococcus faecium*, and *Lactobacillus sp.*
- ❑ This episode does not meet UTI the surveillance case definition. The ICU physician believes that this is a catheter-associated UTI and wants you to report the case to the surveillance network. How would you respond?
- ❑ Explain need for standardization across hospitals and differences between surveillance def. and clinical infection

# UTI Surveillance – Key Terms and Case Definition

# UTI surveillance

- **This surveillance system tracks microbiologically-confirmed UTIs only**
  - Hospitals participating in UTI surveillance must have microbiology laboratories that can perform quantitative urine culture and identify organisms to the species level
  - Some surveillance definitions for non-microbiologically confirmed UTIs exist but are not being used in this network
    - Microbiology capacity is good at network hospitals (would be a concern at district hospitals, for example)
    - Case definitions that do not include culture confirmation tend to include many episodes that are likely not true infections and require significant chart review

# UTI case definition – introduction

## □ Microbiologically-confirmed UTI

- Patient must have a clinical sign or symptom of UTI
- Patient must have a positive urine culture w/high levels of bacteria
  - Urine culture must not be contaminated



## **UTI surveillance – urine cultures**

- Microbiology laboratory must be able to produce quantitative results of urine cultures in order to use them for surveillance**
  
- Quantitative results are expressed as counts of colony forming units (CFUs) per milliliter (mL) of urine**
  - Higher CFU/mL = more viable bacteria
  
- CFUs often expressed using logarithmic scale**
  - $10^5$  CFU/mL = 100,000
  - $10^2$  CFU/mL = 100
  
- CFU thresholds are included in surveillance case definitions**

## UTI surveillance – urine cultures

- **A single urine culture with more than 2 organisms identified is routinely regarded as a contaminated culture and is not used in UTI surveillance**
  - *K. pneumoniae*, *E. coli*, and *C. freundii* are isolated from a urine culture collected on 1 September. This culture should be considered contaminated and cannot be used to meet UTI surveillance criteria.
  
- **If more than two organisms are isolated over multiple urine cultures, the cultures can be used to meet the UTI surveillance case definition**
  - *K. pneumoniae* and *E. coli* are isolated from a urine culture collected on 1 September. *C. freundii* is isolated from a urine culture collected on 5 September. Since neither urine culture grows more than 2 organisms, both should be investigated for UTI surveillance.

## **UTI surveillance – urine cultures and *Candida* sp.**

- **Some surveillance systems do not include urine cultures that grow *Candida* sp. alone**
  - e.g., US NHSN – “at least one bacterium at  $10^5$  CFU/mL”
  - Question of colonization vs. true infection
  
- **This network’s UTI surveillance includes urine cultures with *Candida* sp.**
  - Unclear what pathogen distribution in India will be; can collect information on all UTIs and then re-assess
  - Better to report all organisms and then remove subset of UTIs during data analysis vs. reporting a subset of UTIs based on limited evidence

# Which urine cultures can be used for UTI surveillance?

Date	Culture result
10 October	Mixed flora
12 October	<i>E. coli</i>
14 October	<i>E. coli</i> , <i>A. baumannii</i> , <i>Lactobacillus sp.</i>
15 October	<i>C. albicans</i> , <i>K. pneumoniae</i>

# Which urine cultures can be used for UTI surveillance?

Date	Culture result	Use in surveillance?
10 October	Mixed flora	No
12 October	<i>E. coli</i>	Yes
14 October	<i>E. coli</i> , <i>A. baumannii</i> , <i>Lactobacillus sp.</i>	No
15 October	<i>C. albicans</i> , <i>K. pneumoniae</i>	Yes

- ❑ A single urine culture with more than 2 organisms identified is considered to be contaminated and should not be used for UTI surveillance

# UTI surveillance – case definition

□ A patient with all of the following meets the UTI case definition:

- A positive urine culture with no more than 2 species of organisms
- At least one organism in the urine culture with  $\geq 10^5$  (100,000) CFU/mL
- At least one of the following signs or symptoms:
  - Fever ( $>38^{\circ}\text{C}$  core)
  - Suprapubic tenderness
  - Urgency
  - Frequency
  - Dysuria

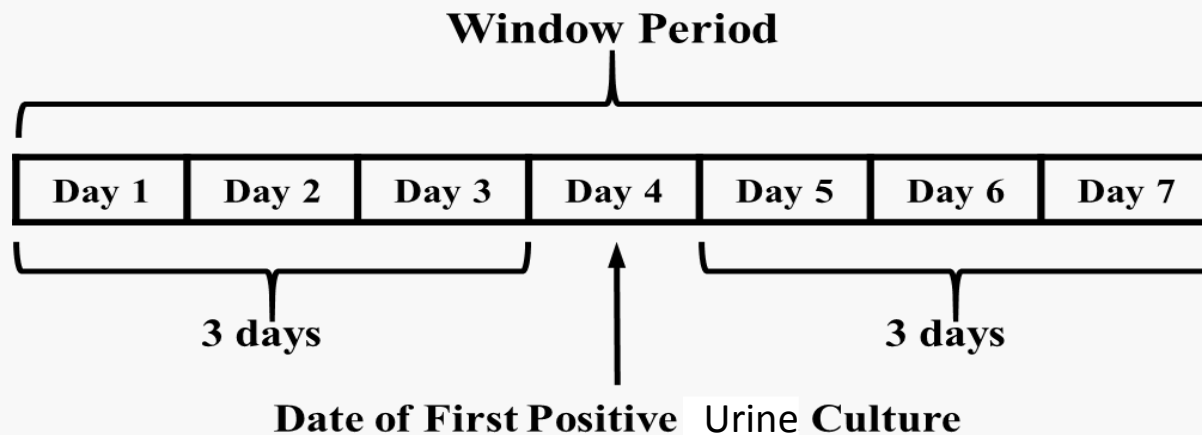
## **UTI surveillance – symptoms**

- **It may be challenging to obtain urinary symptoms from various sub-populations of patients:**
  - Ventilated or heavily sedated patients
  - Patients with spinal cord injury
  
- **Surveillance definitions must balance sensitivity with feasibility**
  - Special case definitions for ventilated patients, spinal cord injury patients, brain injury patients, etc. would become hard to manage
  
- **Follow case definition as written**
  - Physical exam may allow for non-verbal communication of pain or tenderness

# Key terms – UTI surveillance

## □ Window Period

- The UTI case definition must be met within a 7 day time frame known as the “Window Period”
- Includes the date the first positive urine culture is collected, the three calendar days before, and the three calendar days after





## Setting the window period

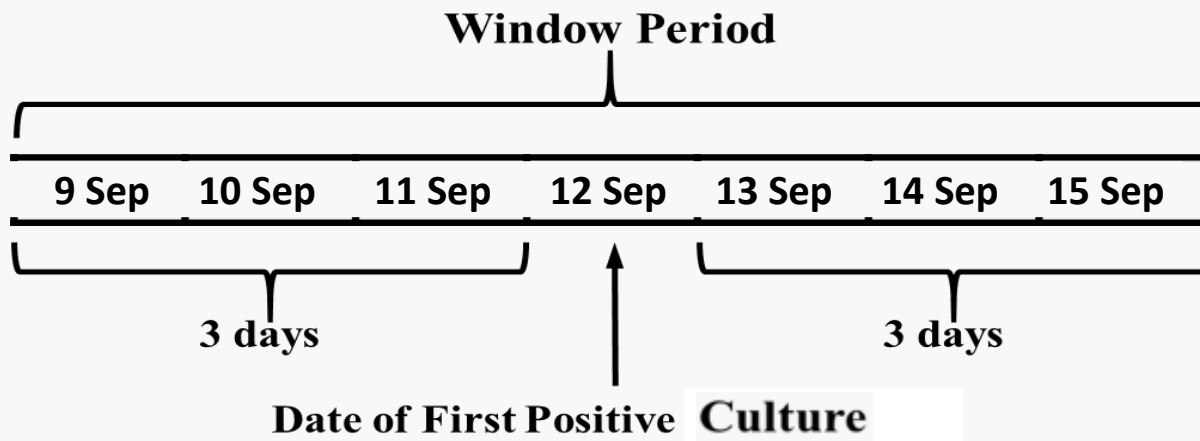
- ❑ The microbiology lab calls you on 13 September to report that a urine culture collected from a patient in the ICU on 12 September is growing *K. pneumoniae* (900,000 CFU/mL) and *E. coli* (10,000 CFU/mL).
- ❑ Based on the results of the culture, should you investigate this as a potential UTI?
- ❑ If so, what is the window period for this potential UTI?

## Setting the window period

- The microbiology lab calls you on 13 September to report that a urine culture collected from a patient in the ICU on 12 September is growing *K. pneumoniae* (900,000 CFU/mL) and *E. coli* (10,000 CFU/mL).
  
- Based on the results of the culture, should you investigate this as a potential UTI?
  - Yes:
    - The urine culture is only growing 2 organisms
    - *K. pneumoniae* growing more than  $10^5$  CFU/mL
      - *E. coli* is growing less than  $10^5$  CFU/mL – but recall that case definition only requires one organism with more than  $10^5$  CFU/mL

## Setting the window period

- The microbiology lab calls you on 13 September to report that a urine culture collected from a patient in the ICU on 12 September is growing *K. pneumoniae* (900,000 CFU/mL) and *E. coli* (10,000 CFU/mL).
- If so, what is the window period for this potential UTI?



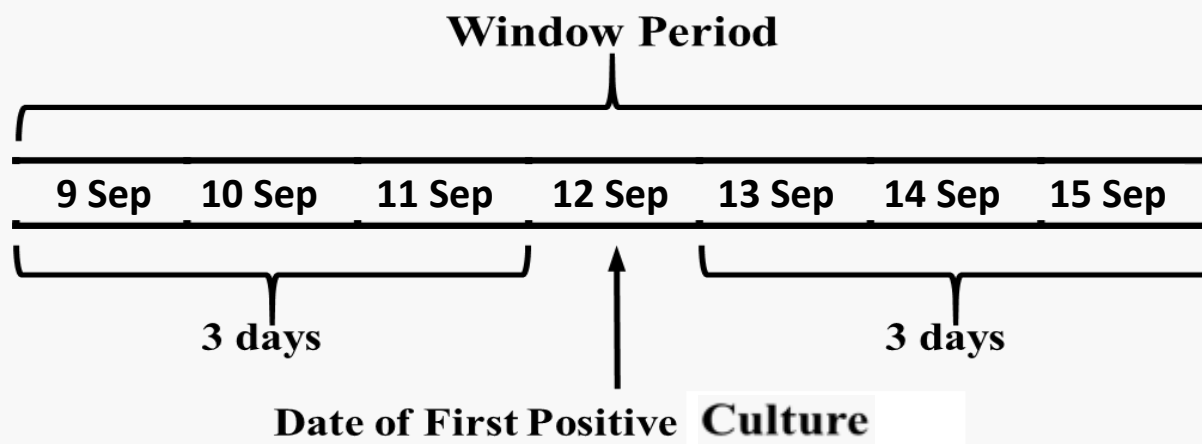
# Key terms – UTI surveillance

## □ Date of event

- The date when the first element used to meet the UTI case definition occurs for the first time within the window period
  - If the urine culture is collected before onset of signs and symptoms, date of culture collection will be the date of event
  - If signs and symptoms appear before collection of urine culture, date of symptom onset will be the date of event

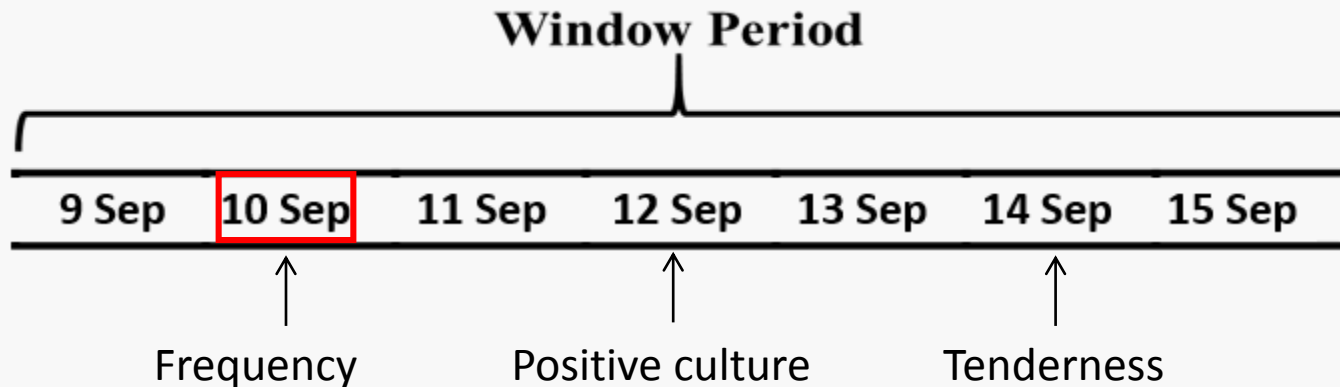
## Determining the date of event

- You review the chart of the patient in the previous example and find that the patient complained of urinary frequency on 10 September and suprapubic tenderness on 14 September. The patient meets the UTI case definition. What is the date of event for this UTI?



## Determining the date of event

- You review the chart of the patient in the previous example and find that the patient complained of urinary frequency on 10 September and suprapubic tenderness on 14 September. The patient meets the UTI case definition. What is the date of event for this UTI?



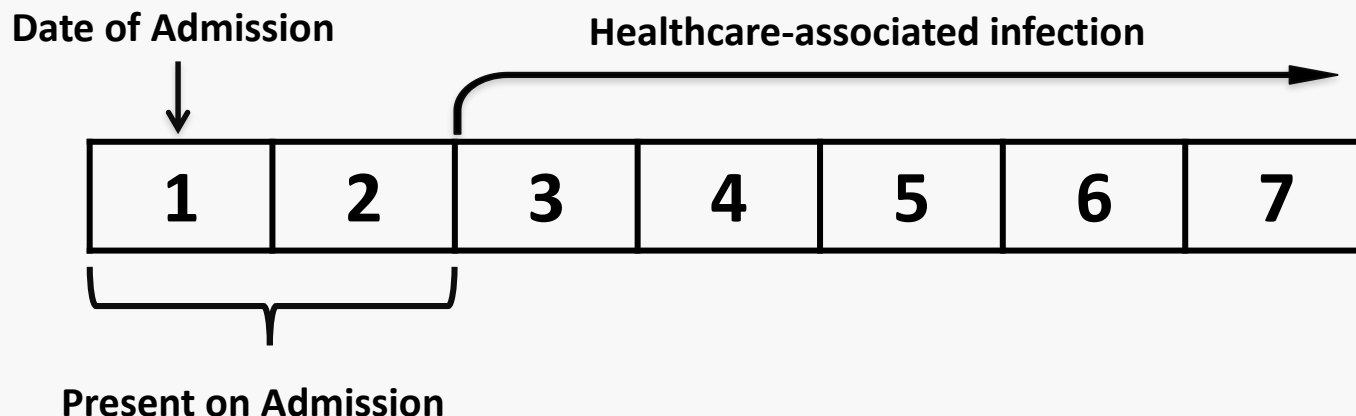
# Key terms – UTI surveillance

## □ Healthcare-associated infection (HAI)

- Date of event >2 calendar days after date of hospital admission
- Date of hospital admission = Day 1

## □ Present on admission (POA)

- Date of event occurs  $\leq 2$  calendar days after hospital admission



# Key terms – UTI surveillance

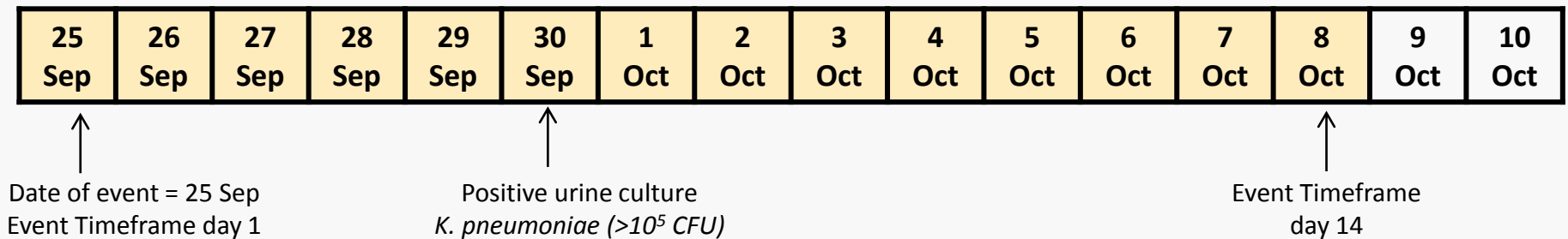
- Surveillance protocol includes a rule to separate HAI events for the same patient
  
- **Event Timeframe**
  - 14-day timeframe during which UTI is considered to be ongoing and no new UTIs can be reported for the patient
  - Date of event = day 1 of the Event Timeframe
  - Organisms identified from urine cultures taken during the Event Timeframe are added to the case report form of the initial UTI



# Key terms – UTI surveillance

## □ Example – *E. coli* UTI with date of event of 25 September:

- Date of event is Day 1 of Event Timeframe
- Event Timeframe = 25 Sept to 8 Oct (14 days)



- No new UTIs for this patient can be reported between 25 Sept and 8 Oct
- *K. pneumoniae* from urine culture collected on 30 Sept is not a new UTI per surveillance rules
  - Organism/susceptibility data is added to the patient's case report form for the 25 Sept UTI

## Case scenario – UTI case definition

On 3 July, a 46 year-old patient was transferred to the ICU after 2 weeks on the cardiac ward. On 6 July, the patient has a temperature of 38.3 C and blood and urine specimen are collected for culturing. Blood cultures are negative. Urine culture is positive for >100,000 CFU/ml of *Klebsiella pneumoniae*, *Citrobacter freundii* and *E. coli*.

- ❑ Was the UTI case definition met?
  
- ❑ Why?

## Case scenario – UTI case definition

On 3 July, a 46 year-old patient was transferred to the ICU after 2 weeks on the cardiac ward. On 6 July, the patient has a temperature of 38.3 C and blood and urine specimen are collected for culturing. Blood cultures are negative. Urine culture is positive for >100,000 CFU/ml of *Klebsiella pneumoniae*, *Citrobacter freundii* and *E. coli*.

❑ Was the UTI case definition met? **No**

❑ Why?

**More than 2 organisms were isolated from the urine culture. Urine cultures with > 2 organisms are regarded as contaminated cultures.**

## **UTI Surveillance – Inclusion Criteria**

- Recall that inclusion criteria have been developed to confirm that a UTI is healthcare-associated and attributable to an ICU participating in surveillance**
  
- UTIs meeting ALL of the following must be reported:**
  - Date of event >2 calendar days from hospital admission, with date of hospital admission as Day 1
  - Date of event >2 calendar days from surveillance unit admission, with date of surveillance unit admission as Day 1
  - Date of event does not occur within the Event Timeframe of a previously identified UTI
  
- If the UTI does not meet ALL of the above, it is not reported**

## Case scenario

A 79 year-old patient was admitted directly to the ICU on December 10. The patient has no history of previous UTIs. On January 8, a urine sample was collected and was positive for 100,000 CFU/ml of *E. coli*. Chart review revealed that the patient had diarrhea and a temperature of 38.5 C on January 7.

- ❑ Does this case meet the inclusion criteria?

## Case scenario

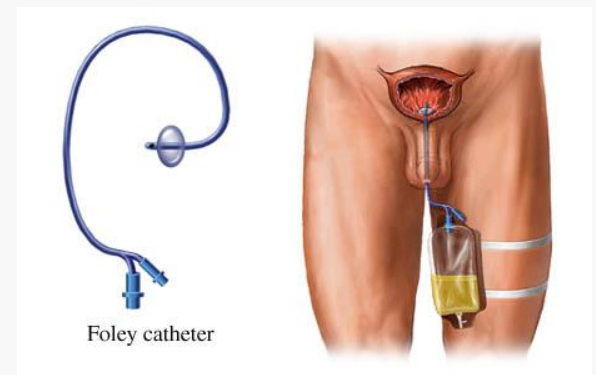
A 79 year-old patient was admitted directly to the ICU on December 10. The patient has no history of previous UTIs. On January 8, a urine sample was collected and was positive for 100,000 CFU/ml of *E. coli*. Chart review revealed that the patient had diarrhea and a temperature of 38.5 C on January 7.

- ❑ Does this case meet the inclusion criteria? **YES**
  - Date of event >2 calendar days from hospital admission
  - Date of event > 2 calendar days from ICU admission
  - Date of event not within the Event Timeframe of a previous UTI

# Additional definitions – catheter-associated UTI

## □ Indwelling urinary catheter:

- Drainage tube inserted into the urinary bladder through the urethra that is left in place and connected to a drainage bag
  - Also called a Foley catheter
- Condom catheters, straight in-and-out catheters, suprapubic catheters, or nephrostomy tubes are not considered indwelling urinary catheters for this surveillance



## **Additional definitions – catheter-associated UTI**

- **A catheter-associated UTI (CAUTI) is defined as a UTI in a patient that also meets one of the following criteria:**
  - An indwelling urinary catheter has been in place for >2 calendar days on the date of event, with day of catheter placement being Day 1
  - OR**
  - An indwelling urinary catheter was in place for >2 calendar days but had been removed on the date of event or the day before the date of event



## Additional definitions – catheter-associated UTI

- Example – urinary catheter in place for >2 calendar days on the date of event, with day of device placement being Day 1

19 Oct	20 Oct	21 Oct (DOE)	22 Oct	23 Oct
Foley placed (day 1)	Foley day 2	<i>E. coli</i> 10 <sup>5</sup> CFU Fever	Foley day 4	Foley day 5

Indwelling catheter has been in place for 3 calendar days on the date of event

- Example – urinary catheter in place for >2 calendar days but removed on the date of event or the day before the date of event

5 Nov	6 Nov (DOE)	7 Nov	8 Nov	9 Nov
Foley removed (day 18)	<i>E. coli</i> 10 <sup>5</sup> CFU Tenderness			New Foley placed

Indwelling catheter was in place for 18 days and removed the day before date of event

## **Is this a catheter-associated UTI?**

**You have identified a patient who meets the UTI case definition with date of event of 5 October. The patient has been in the ICU since 1 October.**

**The patient had a Foley catheter placed upon arrival to the ICU on 1 October, which was removed on 4 October.**

## Is this a catheter-associated UTI? **Yes.**

You have identified a patient who meets the UTI case definition with date of event of 5 October. The patient has been in the ICU since 1 October.

The patient had a Foley catheter placed upon arrival to the ICU on 1 October, which was removed on 4 October.

1 Oct	2 Oct	3 Oct	4 Oct	5 Oct	6 Oct
UC Day 1	UC Day 2	UC Day 3	UC Day 4		
			Day before date of event	Date of event	

**Urinary catheter removed day before day of event – this meets CAUTI definition**

## Identifying CAUTIs

- ❑ Case report form does not directly ask for the surveillance team to determine if the UTI was a CAUTI
- ❑ Surveillance team should report all UTIs that meet case definition and inclusion criteria
- ❑ CRF asks about history of urinary catheter use for each case. Data system determines whether or not the case is a CAUTI or non-CAUTI based on the answers to these questions.

# UTI Surveillance – Case Finding

# Implementing UTI surveillance: case finding

- **Work with microbiology lab to get regular positive urine culture data**
  - Check urine culture log book each day? Daily reports on ICU patients?
  - Ensure that surveillance team can access quantitative urine cultures
  
- **Work with ICU clinical staff to evaluate all patients for potential UTI**
  
- **Query a variety of data sources**
  - Medical records
  - Laboratory records
  - Conversations with clinical staff

# Implementing UTI surveillance: case finding

- **Appendix 1 of the generic HAI surveillance module protocol gives an example of how to find UTI cases**
  - Actual surveillance process will vary by hospital!
  - As long as all hospitals use the same surveillance case definition and case finding techniques, this is OK.
  
- **Surveillance process will likely improve over time**
  - Initial months of surveillance may yield lower quality data as all parties get used to the new protocol and case definitions
  - Fine tuning of surveillance process can occur as a hospital gains experience and identifies challenges
  
- **Hospitals will be offered “support visits” to help with surveillance implementation**

# Implementing UTI surveillance: case finding

## □ Suggested steps per Appendix 1 of generic HAI protocol:

1. Review microbiology reports daily to identify new positive urine cultures from surveillance units
2. Confirm that patient was housed in the surveillance unit when the culture was collected
3. Review clinical and laboratory data for each patient with a new positive culture to confirm that it is the patient's first
4. Use the date that the first positive culture was collected to create the window period



# Implementing UTI surveillance: case finding

## □ Suggested steps per Appendix 1 of generic HAI protocol:

5. Set the date of event based on laboratory or clinical sign/symptom dates
6. Use the date of event to determine if the patient was in the hospital for at least 2 calendar days. If not, do not continue.
7. Use the date of event to determine if the patient was in the surveillance ICU for at least 2 calendar days. If not, do not continue.
8. Confirm that the date of event does not fall in the Event Timeframe of a previous UTI for the patient. If it does, do not continue.

# Implementing UTI surveillance: case finding

## □ Suggested steps per Appendix 1 of generic HAI protocol:

9. Confirm that the entire UTI case definition was met during the Window Period. If not, do not continue.

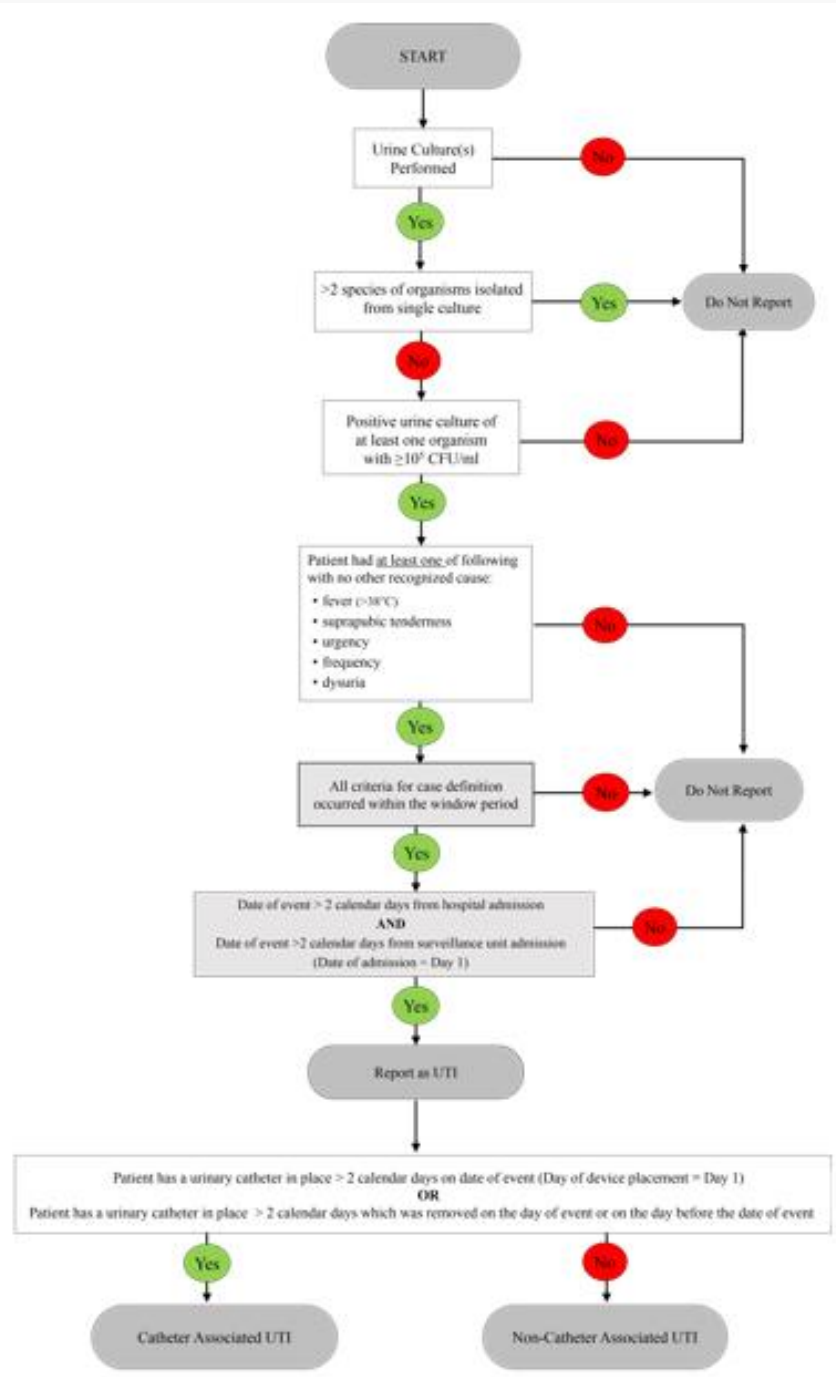
10. Assign the patient a Case ID from the patient register and start a case report form

11. Create an Event Timeframe for the UTI

12. Follow the patient's laboratory results for the full Event Timeframe and report additional urine cultures

13. Complete the case report form and submit to network surveillance team

# Flowchart – UTI module Appendix 1



# Worksheet and table

## Urinary Tract Infection (UTI) – Case Investigation Worksheet and Table

For all positive urine cultures:

- Record collection date of urine culture: \_\_\_/\_\_\_/\_\_\_ Continue to Question 2.
- Does the urine culture have at least one organism with  $\geq 10^5$  CFU/mL?
  - Yes. If selected, continue to Question 3.
  - No. If selected, the case definition is not met. **Do not report this episode.**
- Does the urine culture have more than 2 species isolated from it?
  - Yes. If selected, the case definition is not met. **Do not report this episode.**
  - No. If selected, continue to Question 4.
- Did the patient have at least one of the following signs or symptoms during the window period?
  - Yes. If selected, record the signs/symptoms on the case investigation table and continue to Question 5.
  - No. If selected, the case definition is not met. **Do not report this episode.**

### UTI Signs & Symptoms

- Fever ( $>38^{\circ}\text{C}$ )

UTI Case Investigation Table					
Hospital Admission Date: ___/___/___			ICU Admission Date: ___/___/___		
Date	First Positive Culture Record information for first positive urine culture on the line with the X.	Window Period Record additional cultures and symptoms.	Date of Event (DOE) Indicate DOE with an X.	Event Timeframe Record positive cultures from urine cultures collected during the 14 days after the DOE. DOE = Day 1.	Urinary Catheter? (Y/N)
	X				

# UTI Surveillance – Case Report Form

# UTI case report form

Surveillance unit Number _____		Case ID: _____
Case Type _____		
Patient Name _____		
Medical record Number: _____		
Hospital Name: _____		
Sex: <input type="checkbox"/> Male <input type="checkbox"/> Female	Date of Birth (DD/MM/YYYY): __/__/__ Age(Years): _____ <input type="checkbox"/> Age/DOB (Unknown)	Birth weight: _____grams (NICU only)
Date of hospital admission: ____/____/____		Date of admission to surveillance unit: ____/____/____
Location prior to hospital admission: <input type="checkbox"/> Home / Community <input type="checkbox"/> Another hospital <input type="checkbox"/> Unknown		
Linked Case ID (autogenerated) do not fill on Hard copy. <b>Only to be filled on software</b>		

## Instructions for completing CRF – protocol, appendix 3

### Initial section of CRF captures demographic data

- Birth weight only required for cases identified in NICU (if hospital is doing surveillance in NICU)
- Use medical record or other sources of information to determine where patient was located before hospital admission, if possible
- Ensure that dates of hospital admission and admission to the surveillance unit are accurately captured

# UTI case report form

1. UTI Details	
Date of event ( <u>dd/mm/yyyy</u> ):	___/___/___
Type of UTI	<input type="checkbox"/> Culture Confirmed UTI
<b>Fill out culture results in Section 4, Organisms and Antibiotic Susceptibility</b>	

## Section 1 of CRF captures UTI information

- Record the date of event – recall that this is the date when the first criteria used to meet the case definition occurred
  - If first criteria met is a positive urine culture, then use date of **specimen collection** as date of event
- Tick the box to confirm that this is a microbiologically confirmed UTI
  - Details on the organism(s) isolated from urine and their antibiotic susceptibilities will be collected later in the CRF

# UTI case report form

2. Invasive Devices: Urinary Catheters	
Did the patient have a Foley catheter in place at any time on: <ul style="list-style-type: none"><li>• The date of event <b>or</b></li><li>• The day before the date of event?</li></ul>	<input type="checkbox"/> Yes <input type="checkbox"/> No ( <i>skip to 3, Outcome</i> )
If <b>YES</b> , was the Foley catheter in place for >2 calendar days?	<input type="checkbox"/> Yes <input type="checkbox"/> No

- ❑ **Section 2 of CRF records details of the patient's urinary catheter:**
  - Was the catheter in place on the date of event or the day before?
  - Was the catheter in place for at least 2 calendar days?



# UTI case report form

3. Outcome	
Patient status at end of Event Timeframe (14 days after DOE, where DOE = day 1)	<input type="checkbox"/> Still in surveillance unit <input type="checkbox"/> Transferred to other hospital <input type="checkbox"/> Transferred to other ward/unit within the hospital <input type="checkbox"/> Discharged <input type="checkbox"/> LAMA <input type="checkbox"/> Died <input type="checkbox"/> Unknown <p style="text-align: right;">Date of discharge, transfer, or death ____/____/____</p>
Patient outcome at end of hospitalization	<input type="checkbox"/> Discharged <input type="checkbox"/> Transferred to other hospital <input type="checkbox"/> LAMA <input type="checkbox"/> Died <input type="checkbox"/> Unknown <p style="text-align: right;">Date of discharge, transfer, or death: ____/____/____</p>

## Section 3 of CRF tracks patient outcomes

- Indicate the status of the patient at the end of the Event Timeframe
  - If a patient is still in the surveillance unit at the end of this time period, tick that box
- Indicate the status of the patient at the end of their hospitalization and record date of discharge, transfer, or death
  - Small minority of cases might require long period of tracking

# UTI case report form

_____	<i>Staphylococcus aureus</i>	LEVO S I R N	MOXI S I R N	CLIND S I R N
		MINO S I R N	ERYTH S I R N	GENT S I R N
		OTHER DRUG 2 S I R N	OTHER DRUG 3 S I R N	OTHER DRUG 4 S I R N
_____	<i>Acinetobacter baumannii</i>	AMK S I R N	AMPSUL S I R N	CEFTAZ S I R N
		LEVO S I R N	COL S I R N	PB S I R N
		TICLAV S I R N	MERO S I R N	DORI S I R N

## □ Section 4 of CRF reports the organisms in the patient's urine culture(s) and their susceptibility results

- For each organism found in urine during the window period/Event Timeframe, record the collection date in front of the organism name
- If the organism is not in the list, record its name and specimen collection date in the "Other Organisms" section at the end of the table

# UTI case report form – urine cultures

_____	<i>Staphylococcus aureus</i>	CIPRO/LEVO/MOXI	CLIND
		S I R N	S I R N
_____		OX/CEFOX/METH	RIF
		S I R N	S I R N

## Drug Codes:

AMK = amikacin

AMP = ampicillin

AMPSUL = ampicillin/sulbactam

AMXCLV = amoxicillin/clavulanic acid

ANID = anidulafungin

AZT = aztreonam

CEFTRX = ceftriaxone

CEFUR= cefuroxime

CTET= cefotetan

CIPRO = ciprofloxacin

CLIND = clindamycin

COL = colistin

## Result Codes

S = Susceptible I = Intermediate R = Resistant NS = Non-susceptible S-DD = Susceptible-dose dependent N = Not tested

## □ Section 4 of CRF reports the organisms in the patient's urine culture(s) and their susceptibility results

- For each organism from urine that is reported on the CRF, record the results of its antimicrobial susceptibility testing
- Antimicrobials and results are shown as codes; list of codes is provided at the end of the form
- Antimicrobials not included in testing panel should be recorded as "N"

# Patient Register (generic HAI module, appendix 3)

Hospital Name:		Surveillance Unit Number:					Year:			
Date of Hospital Admission <i>(dd/mm/yyyy)</i>	Date of Event <i>(dd/mm/yyyy)</i>	Case ID					Patient Name	Medical Record Number	Related Case IDs <i>(All Case IDs assigned to this patient since admission)</i>	
		Hospital Number	Surveillance Unit Number	Event Number	BSI	UTI				
01/01/2015	01/03/2015	1	1	000000	✓		Example			

- ❑ The register is used to track HAI cases in each hospital
- ❑ Register will be helpful to track patients with multiple HAI events over time
- ❑ Case IDs from the register will be added to individual case report forms
  - Case ID will be sent to central network team, patient name/MRN will not

# UTI Surveillance – Denominator Data Collection and Reporting

# UTI surveillance – denominator data

- **Denominator data is used to calculate incidence rates**
  - Captures the population at risk for infection during a defined period of time
  
- **Two denominators are collected each day in UTI surveillance**
  - **Urinary catheter days:**
    - Number of patients in the surveillance unit with an indwelling (Foley) catheter in place
  - **Patient days:**
    - Total number of patients in the surveillance unit
    - Should be collected at the same time as urinary catheter days

# Collecting denominator data

- **Denominator data should be collected at the same time every day**
  - Even on weekends or holidays
  - Denominators should only reflect the patients present in the surveillance unit at the time of collection
  - Data collection can be done by surveillance staff or clinical staff working in the surveillance unit
  
- **Each surveillance location should have its own denominator data collection form**
  - Denominator counts are recorded on the form for each day
  - Daily counts are added up at the end of each month and the form is given to the hospital surveillance team
  - A new denominator data collection form is started in each surveillance unit on the first day of each month

# Denominator data collection form

Hospital Name:		Surveillance Unit Number:		Month:	Year:
Date	Number of Patients	Number of patients with $\geq 1$ central line		Number of patients with urinary catheter	
1					
2					
3					
4					
5					

- Form included in generic HAI module protocol as Appendix 2
- Denominators for both BSI and UTI are included on the same form for easier data collection



# UTI Surveillance – Data Analysis and Feedback

# UTI surveillance – analysis metrics

- **Several metrics can be calculated as part of UTI surveillance**
  
- **UTI rates (use patient days as denominator):**
  - Total UTI rate = number of UTIs per 1,000 **patient days**
  
- **CAUTI rates (use urinary catheter days as denominator):**
  - CAUTI rate = number of CAUTIs per 1,000 **urinary catheter days**
  
- **Urinary catheter use:**
  - Device utilization ratio (DUR) = proportion of patient days that are also urinary catheter days

## UTI surveillance – metrics

$$\text{UTI incidence rate} = \frac{\text{Number of UTIs}}{\text{Number of patient days}} \times 1,000$$

$$\text{CAUTI incidence rate} = \frac{\text{Number of CAUTIs}}{\text{Number of urinary cath days}} \times 1,000$$

$$\text{Urinary catheter utilization ratio} = \frac{\text{Number of urinary cath days}}{\text{Number of patient days}} \quad (\times 100)$$

## **UTI surveillance – incidence rates**

- ❑ You have completed three months of surveillance in your medical ICU.**
- ❑ You identified 6 UTIs (2 of which were CAUTI) during these three months and would like to calculate incidence rates.**
- ❑ There were 950 patient days and 650 urinary catheter days in the medical ICU during this three month period.**
- ❑ What is the overall UTI rate and the CAUTI rate in the medical ICU for this three month period?**

## UTI surveillance – incidence rates

$$\text{UTI incidence rate} = \frac{6 \text{ UTIs}}{950 \text{ patient days}} \times 1,000 = 6.3/1,000 \text{ pt. days}$$

$$\text{CAUTI incidence rate} = \frac{2 \text{ CAUTIs}}{650 \text{ UC days}} \times 1,000 = 3.1/1,000 \text{ UC days}$$

- What would you do with this information? How could you use surveillance data to inform infection control interventions?

# UTI Surveillance – Review and Next Steps

# UTI surveillance – protocol review

## □ Key terms:

- Window period – date of first positive diagnostic test collection +/- 3 calendar days
  - All elements of the UTI case definition must be met during the window period
  
- Date of event - date that the first element used to meet the UTI case definition appears for the first time
  - This could be the date of test collection or the date that first sign/symptom appeared
  
- Event Timeframe – 14 day period (date of event = day 1) when UTI event is considered to be ongoing
  - No new UTIs can be reported for the patient during these 14 days

# UTI surveillance – protocol review

## □ Case definition – microbiologically confirmed UTI

- A positive urine culture with no more than 2 species of organisms
- At least one organism in the urine culture with  $\geq 10^5$  (100,000) CFU/mL
- At least one of the following signs or symptoms:
  - Fever ( $>38^{\circ}\text{C}$  core)
  - Suprapubic tenderness
  - Urgency
  - Frequency
  - Dysuria



# UTI surveillance – protocol review

- **UTIs meeting ALL of the following inclusion criteria must be reported:**
  - Date of event >2 calendar days from hospital admission, with date of hospital admission as Day 1
    - Establishes that UTI is healthcare-associated
  - Date of event >2 calendar days from surveillance unit admission, with date of surveillance unit admission as Day 1
    - Establishes that UTI is attributable to the surveillance unit
  - Date of event does not occur within the Event Timeframe of a previously identified HAI
    - Establishes that this is a new UTI event for the patient
  
- **If the UTI does not meet ALL of the above, it is not reported**

# UTI surveillance – protocol review

## □ Key terms:

- Catheter-associated UTI (CAUTI) – a UTI that meets one of the following criteria:

- An indwelling urinary catheter has been in place for >2 calendar days on the date of event, with day of catheter placement being Day 1

**OR**

- An indwelling urinary catheter was in place for >2 calendar days but had been removed on the date of event or the day before the date of event