

**Point Prevalence Survey of Healthcare Associated
Infection (HAI) and Antimicrobial use (AU) in US
nursing homes:
Urinary Tract Infections (UTI)**

Data from Centers for Disease Control and Prevention (CDC)
& the Emerging Infections Program (EIP)

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Primary objectives: CDC 2017 NH prevalence survey

- Measure number/proportion of HAIs and HAI types in nursing homes
 - Using revised McGeer criteria for residents in LTC¹
- Identify number/proportion and types of antimicrobial drugs used in nursing home residents

SHEA/CDC POSITION PAPER

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

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(See the commentary by Moro, on pages 978–980.)

Infection surveillance definitions for long-term care facilities (ie, the McGeer Criteria) have not been updated since 1991. An expert consensus panel modified these definitions on the basis of a structured review of the literature. Significant changes were made to the criteria defining urinary tract and respiratory tract infections. New definitions were added for norovirus gastroenteritis and *Clostridium difficile* infections.

Infect Control Hosp Epidemiol 2012;33(10):965-977

When McGeer and colleagues proposed the first set of infection surveillance definitions specifically for use by long-

supervision and care for impaired cognition, (2) assistance with activities of daily living (ADLs), or (3) skilled nursing

Prevalence survey: Infection types included

■ Urinary tract

- Symptomatic UTI (SUTI)
- Cather-associated SUTI (with indwelling urinary catheter)

■ Respiratory tract

- Pneumonia
- Lower RTI
- Cold/pharyngitis

■ Gastrointestinal

- Gastroenteritis
- CDI
- Norovirus

■ Skin, Soft tissue

- Cellulitis, soft tissue and wound
- Fungal skin infection
- Herpes simplex or zoster
- Scabies

■ Mucosal

- Ear
- Eye (conjunctivitis)
- Oral candidiasis

■ Systemic

- Bloodstream infection
- Sepsis

Symptomatic Urinary Tract Infection (SUTI): Without Indwelling Catheter

- ❑ No indwelling urinary catheter present at first UTI sign/symptom onset

- ❑ And positive urine culture
 - A. Indwelling urinary catheter specimen with at least 10^5 CFU/ml of any number of microorganisms or

 - B. Voided urine culture specimen with at least 10^5 CFU/ml of *no more than 2 species of microorganisms* or

 - C. Straight (in/out) catheter specimen with at least 10^2 CFU/ml of *any number of microorganisms*

And criteria 1, 2 or 3 met

Criteria 1

Either of the following:

- ❑ Acute dysuria
Acute pain, swelling, or tenderness of testes, epididymis or prostate

Criteria 2

Either of the following:

- ❑ Fever
- ❑ Leukocytosis

AND ≥ 1 from Urinary Sign list (below):

- ❑ Acute costovertebral angle pain/tenderness Suprapubic pain/tenderness
- ❑ Gross hematuria New/marked increase incontinence
- ❑ New/marked increase urgency
- ❑ New/marked increase frequency

Criteria 3

Absent Fever and Leukocytosis:

- ❑ Fever
- ❑ Leukocytosis

AND ≥ 2 from Urinary Sign list:

Cather-associated Symptomatic Urinary Tract Infection (CA-SUTI): With Indwelling Urinary Catheter

- Indwelling urinary catheter present at first UTI sign/symptom onset
- And positive urine culture
 - A. Indwelling urinary catheter specimen with at least 10^5 CFU/ml of any number of microorganisms or
 - B. Voided urine culture specimen with at least 10^5 CFU/ml of *no more than 2 species of microorganisms* or
 - C. Straight (in/out) catheter specimen with at least 10^2 CFU/ml of *any number of microorganisms*

And ≥ 1 of the following:

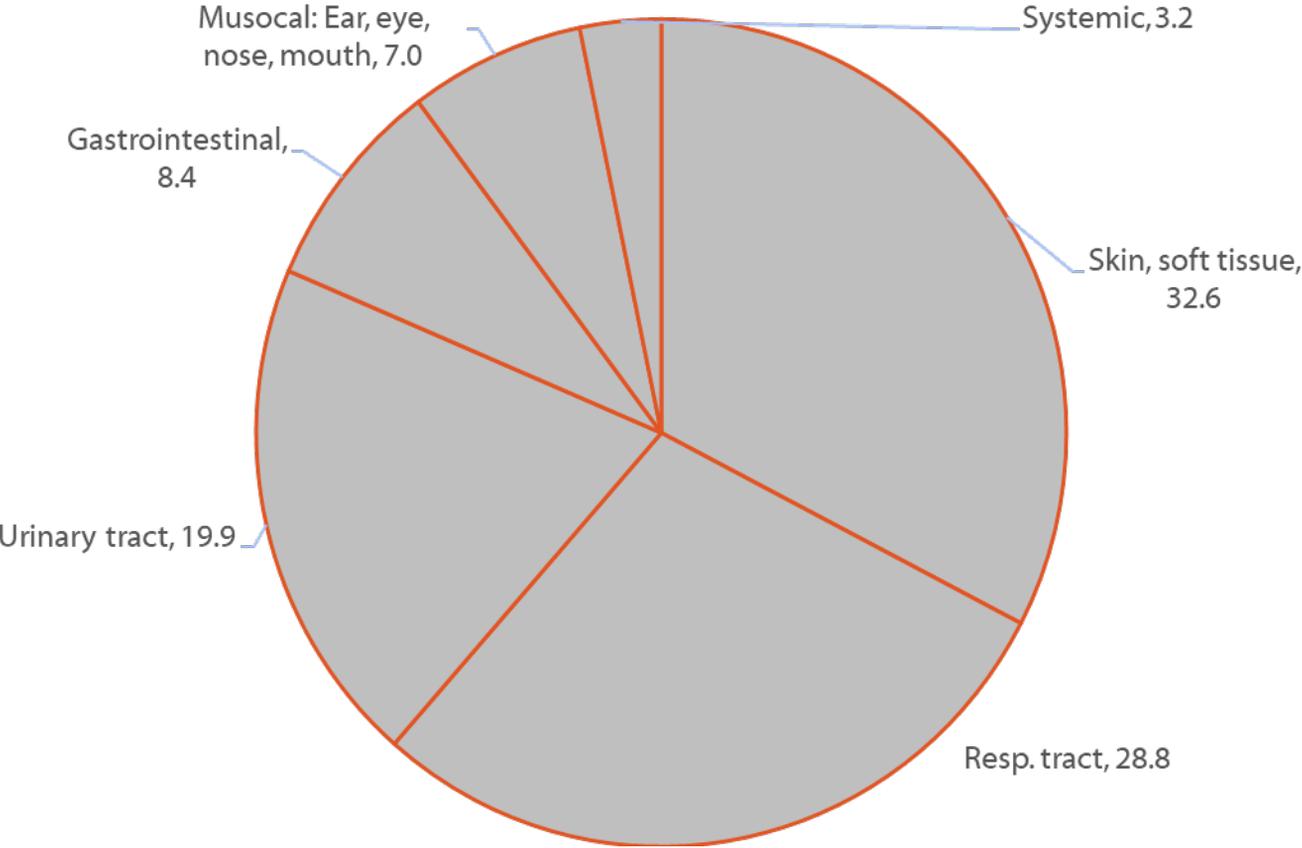
- Fever
- Rigors
- New onset hypotension
- *Acute change in mental status* or acute functional decline AND Leukocytosis
- New/marked increase in suprapubic pain

- Costovertebral angle pain or tenderness
- Acute pain, swelling or tenderness of the testes, epididymis or prostate
- Purulent (pus) discharge from around the catheter

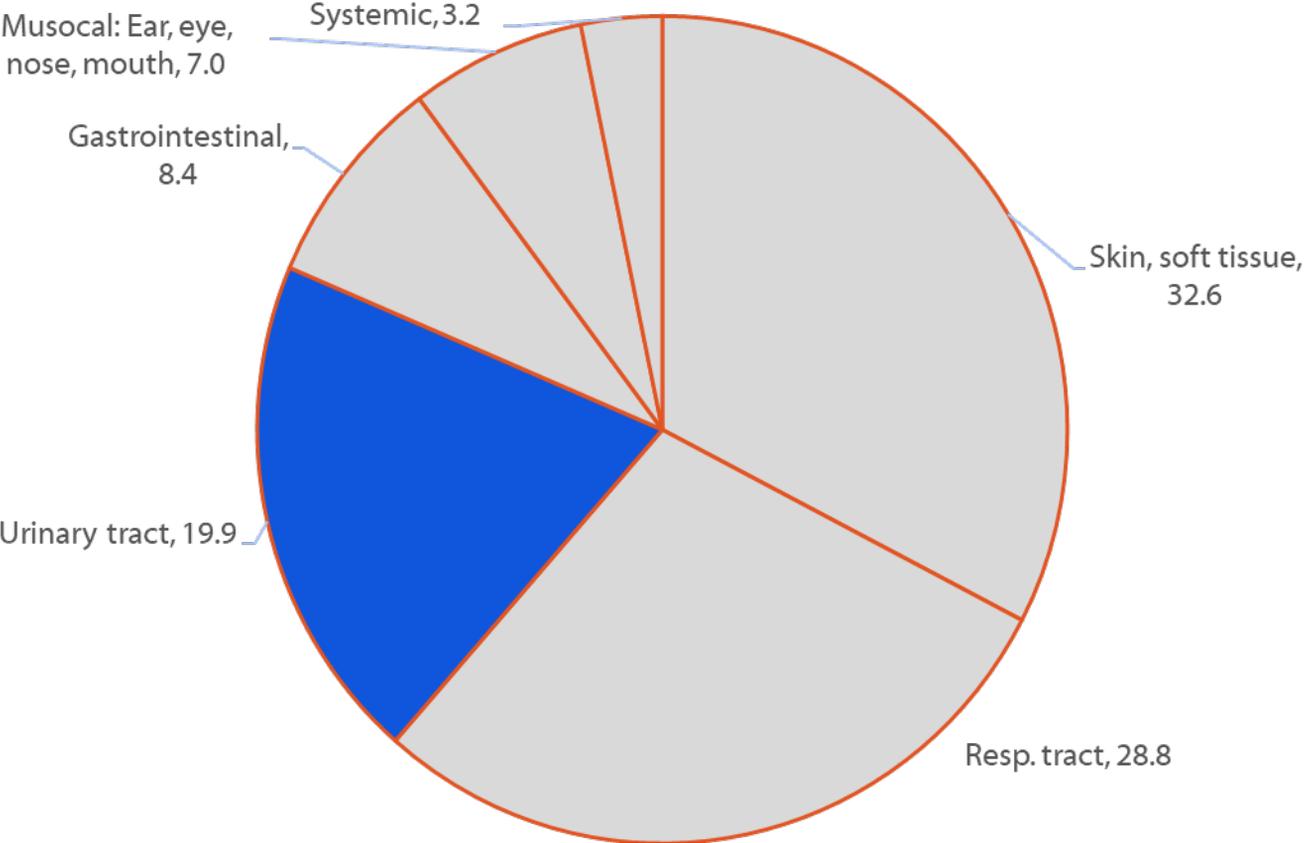
Prevalence survey: Definition for NH-onset infection

- In addition to meeting one of the infection definitions
- For HAI to be a NH-onset infection
 - Infection not present at the time of NH admission
 - Onset on/after day 3 of NH admission
 - Where day of admission is day 1

NH prevalence survey: Percentage by HAI type

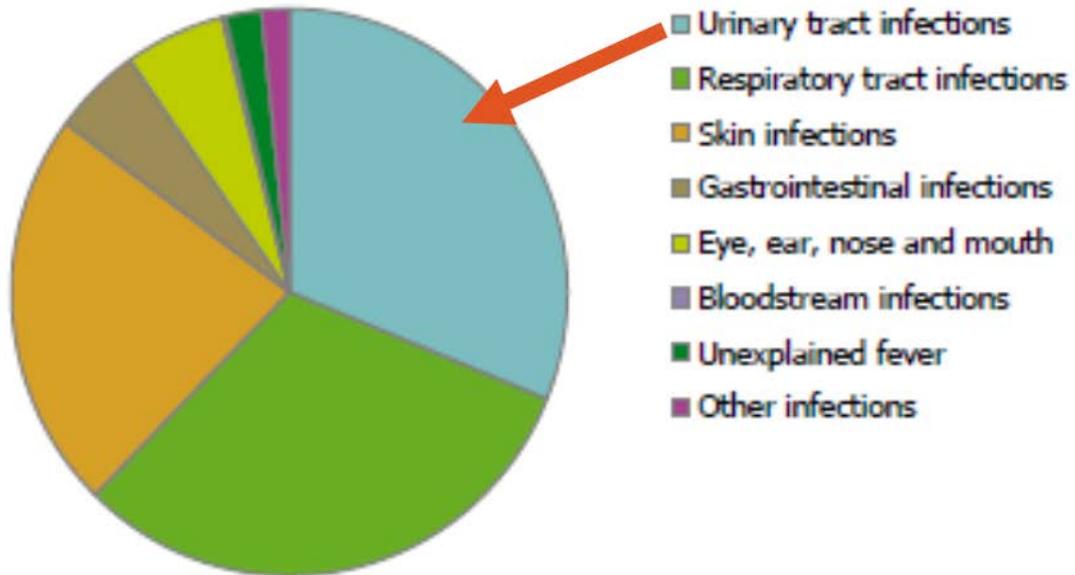


NH prevalence survey: Percentage by HAI type



UTI leading HAI type in LTCF in Europe

Figure 23. Distribution of types of HAI in the included LTCFs, HALT-2, 2013



UTI most common HAI type Dept. of VA community living centers, 2007s

Table 1. Types of NHAIs in VA CLC residents

NHAI	Number of NHAIs	Percentage of all NHAIs	Point prevalence, %
Symptomatic UTI 	179	29.2	1.64
Skin	79	12.9	0.72
Asymptomatic bacteriuria	64	10.4	0.58
Pneumonia	49	8.0	0.45
Soft tissue	33	5.4	0.30
Decubitus ulcer	28	4.6	0.26
Gastrointestinal tract	26	4.2	0.24
Osteomyelitis	24	3.9	0.22

NH prevalence survey: Urinary Tract Infections

- UTI prevalence rate of 0.48 per 100 residents
 - 80% were Symptomatic UTI
 - 20% Catheter associated - Symptomatic UTI
- Includes ONLY the UTIs that met the revised McGeer surveillance definitions
 - Positive urine culture + localizing urinary symptoms
 - Meeting criteria outlined on slides 5 + 6
- Excludes
 - Positive urine culture without localizing urinary symptoms
 - Localizing urinary symptoms without positive urine culture
 - Physician diagnosed UTI*
 - Resident prescribed an antibiotic for UTI*

*Unless, a UTI surveillance definition was also met

Measures of frequency: Incidence and Prevalence

Incidence: Incidence Rate

New cases in a population under observation over a given time period

Measure of risk of acquiring disease/infection

Example:

Number of UTIs per 100,000 resident-days during 2019

Prevalence: Prevalence Rate

Existing cases in a population under observation at a given point in time

Measure of how widespread disease/infections is

Example:

Number of UTIs per 100 residents on July 9, 2019

NHSN LTCF Component: UTI event data

Incidence rates – a measure of risk

All urinary tract infections [†]			
NHs reporting	Event count	Resident days	Overall pooled crude rate
112	2,013	3,429,240	0.59
Noncatheter, symptomatic urinary tract infections [‡]			
NHs reporting	Event count	Non-catheter resident days	Overall pooled crude rate
110	1,593	3,258,717	0.49
Catheter-associated symptomatic urinary tract infections [§]			
NHs reporting	Event count	Urinary catheter days	Overall pooled crude rate
109	407	170,523	2.39

UTI rates per 1,000 resident days; CA-SUTI rate per 1,000 urinary catheter days
 Palms et al. AJIC 2018

NH prevalence survey: Selected characteristics of residents with and without UTI*

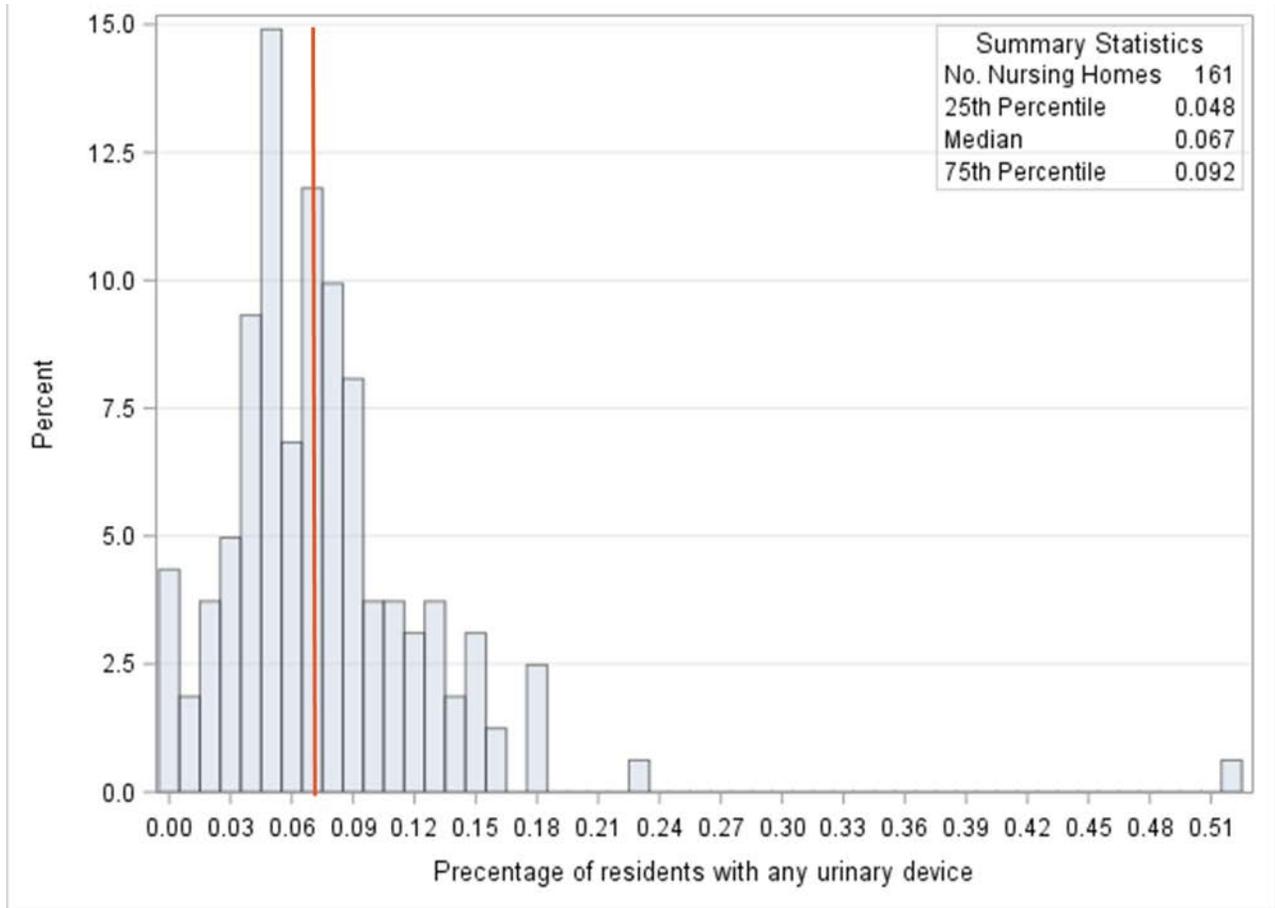
Characteristic	UTI	No UTI	Percent difference
Diabetes	48%	32%	+16%
Short-Stay: post acute care/skilled nursing	34%	19%	+15%
Any urinary catheter	18%	7%	+ 11%
Receiving wound care	29%	19%	+10%
< 65 years of age	22%	17%	+5%
Pressure ulcer	7%	12%	+5%
Female	66%	62%	+ 4%
Receiving dialysis	5%	3%	+3%
Wheelchair bound or bed ridden	52%	54%	-2%

*UTIs that meet revised McGeer definition; ^Chi-square test

NH prevalence survey: Use of urinary devices

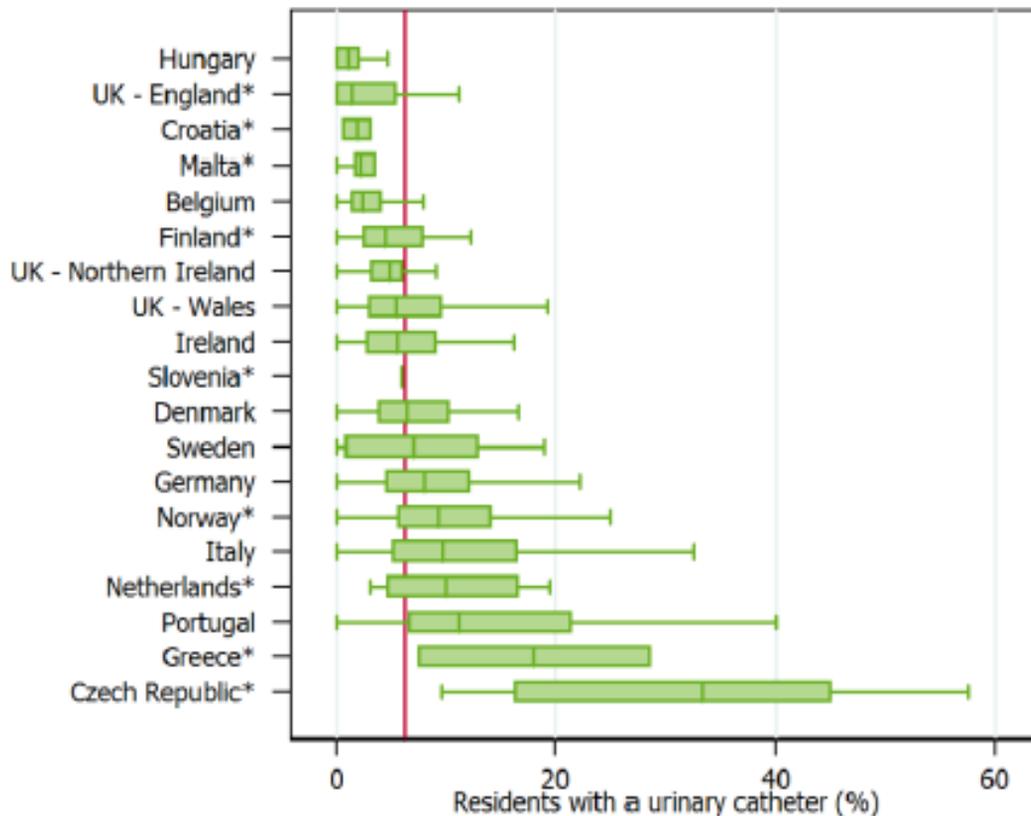
- 5% of residents had indwelling urinary catheter
- 2% of resident had “other” urinary catheter
 - Suprapubic catheters, condom catheters, urostomy or nephrostomy tubes
- 93% had no urinary devices

NH prevalence survey: NH variation in use of urinary catheters



Any urinary device = Indwelling urinary catheter, Suprapubic catheters, condom catheters, urostomy or nephrostomy tubes

Variation in indwelling urinary catheter use: Prevalence survey in European LTCF, 2013



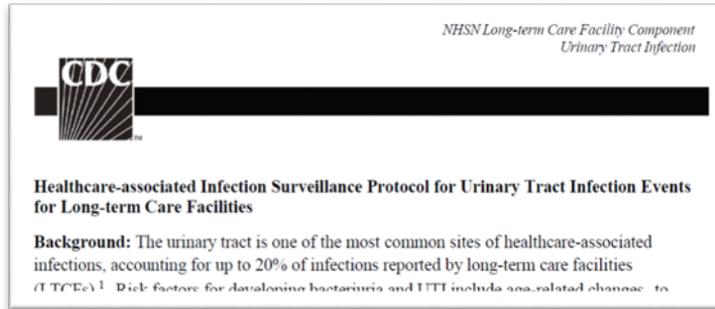
Dept. of VA Prevalence survey: Use of indwelling urinary catheter

Year	Facilities, residents	% residents with Indwelling urinary catheter
VA, 2005 (Tsan, AJIC 2008)	133 CLC, 11,475 res	10.7
VA, 2007 (Tsan, AJIC 2010)	133 CLC, 10,939 res	11.0

- Dept. of VA prevalence surveys documented association between device use and HAI prevalence in LTC setting

Antibiotic for UTI ≠ UTI Surveillance Event

- NHSN LTCF Component* provides criteria to identify UTI Events for surveillance purposes



- Clinical guidelines are used to guide decisions on when to initiate antibiotics for suspected UTI, one example
 - Loeb Minimum Criteria for Initiation of Antibiotics
 - Undergoing an update
- They are different!
 - Because they not used for the same purpose

*Based on revised McGeer

Summary

- UTI among the most common type of HAIs in nursing homes
 - On a given day, ~1 in 200 NH residents with NH-onset UTI (revised McGeer)
- In prevalence surveys, SUTI are more common than CA-SUTI
 - Prevalence is a different measure to UTI Incidence, as used in NHSN
- Use of surveillance definitions are essential to ensure
 - The same thing (UTI) is being counted
 - To enable meaningful comparison with others
 - To correctly interpret changes over time
- Prevalence survey data aid our understanding of how UTI criteria are used, and identify factors associated with UTI
 - Inform UTI prevention efforts
 - Inform NHSN surveillance

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For more information, contact CDC
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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

