



Epidemiology & Prevention of UTI

NHSN 2018 Training

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Objectives

- Discuss epidemiology of UTI in long-term care (LTC)
 - Review the importance of using standardized definitions for UTI in LTC
 - Discuss role of UTI prevention
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Harms from infections among SNF residents

- Infections were among the most common cause of harm; accounting for 26% of adverse events

Type of Harm	Events related to infection	Infection events deemed preventable	Transfers to hospital from infection event
Adverse events (n=148)	39 (25.8%)	22 (59%)	34 (87.2%)
Temporary (n=113)	20 (16.8%)	9 (45%)	NA

Types of infections causing harm among SNF residents

Type of infection	Events (All harm)	Preventable events
Pneumonia and Respiratory tract	15	5 (33%)
Surgical site infection	14	9 (64%)
Urinary tract	14 (includes 3 cases of sepsis)	10 (71%)
C. Difficile infections	7	5 (71%)

UTI in LTCF

- Most common cause of bacterial infections in LTCF residents
- Criteria used for diagnosis are not consistent across epidemiologic studies
 - Culture alone is not enough to track true incidence of symptomatic UTI
 - Prevalence of ASB in non-catheterized LTCF 25-50% (women)
 - Prevalence of ASB in catheterized LTCF residents 100%
 - Not all studies differentiate between catheter-associated UTI and non-catheterized symptomatic UTI

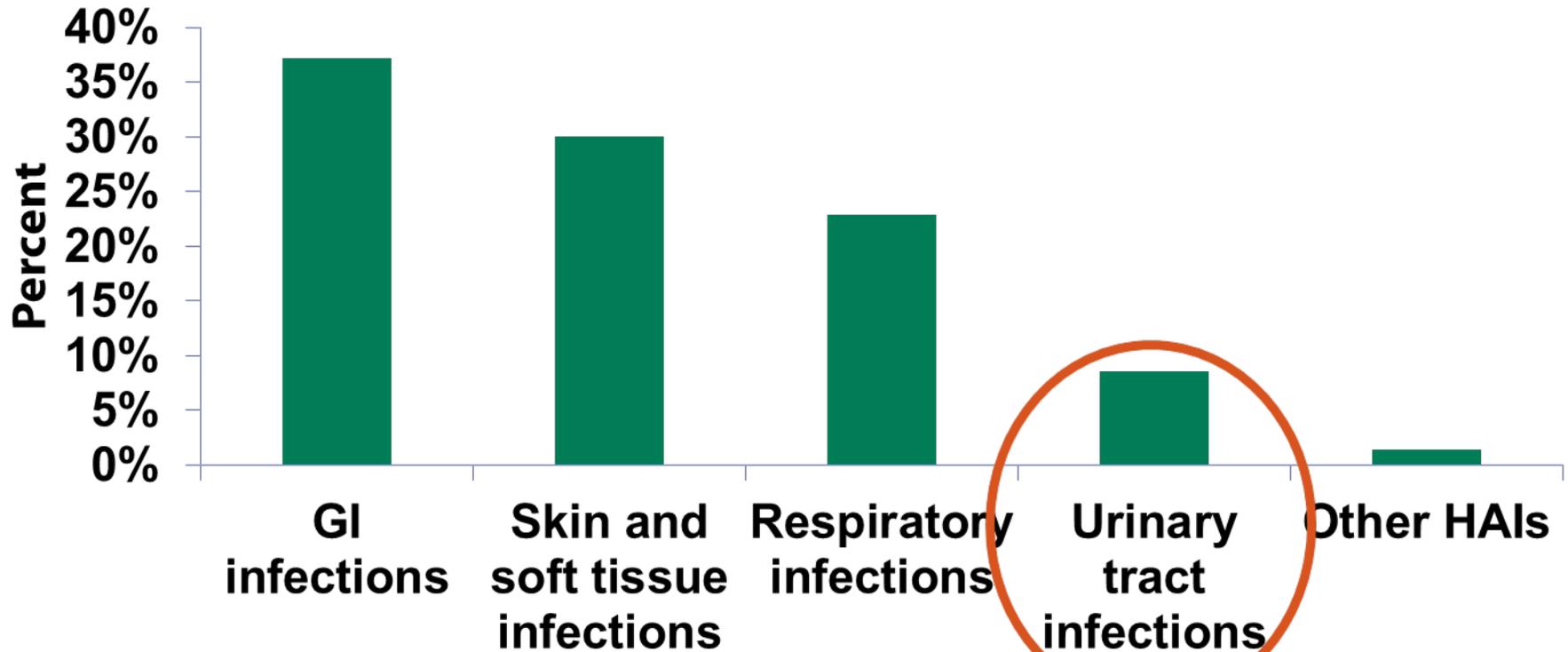
Prevalence of nursing home-associated infections in the Department of Veterans Affairs nursing home care units

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Washington, DC; Bedford, Massachusetts; Atlanta, Georgia; Amarillo, Texas; Ann Arbor, Michigan; and Cincinnati, Ohio

Table I. Types of NHAIs in VA NHCU residents

NHAIs	Number of residents with specific NHAi	Percent of all NHAIs	Point prevalence (%)
Symptomatic UTI	181	28.3	1.58
Asymptomatic bacteriuria	79	12.3	0.69
Pneumonia	60	9.4	0.52
Skin infection	59	9.2	0.51
Gastroenteritis	45	7.0	0.39
Soft tissue infection	37	5.8	0.32

CDC NH Prevalence Survey Pilot, 2013-2014



Palms D. Am J Infect Control. Feb 2018

UTI Definitions

SHEA/CDC 2012

Swelling or tenderness of the testes, epididymis or prostate

or:

Fever or leukocytosis and ≥ 1 localizing UTI subcriteria

or:

≥ 2 UTI subcriteria

AND:

Microorganism identified on culture in appropriate counts

Loeb Criteria 2001

Acute dysuria alone or:

Fever ($>37.9^{\circ}$ or 1.5°C increase in baseline) plus one of the following:

- New or worsening urgency
- Frequency
- Suprapubic pain
- Gross hematuria
- CVA tenderness
- Urinary incontinence

MD Diagnosis and Surveillance Criteria

- Reviewed UTI or pneumonia cases diagnosed and treated by clinicians
- 33/146 (23%) met published surveillance or management criteria

Table 2 Incidence and attributable risk of infection

	Number of infections	
	Device (263 f/u-mon)	Non-device (644 f/u-mon)
Total infections ^a	87	110
Urinary tract infections ^a	49	54
Pneumonia ^a	23	20
Other infections ^b	15	36
McGeer's criteria ^c	8	15
Minimum criteria ^c	12	10
McGeer's or minimum criteria ^c	15	18

Prevention of UTI

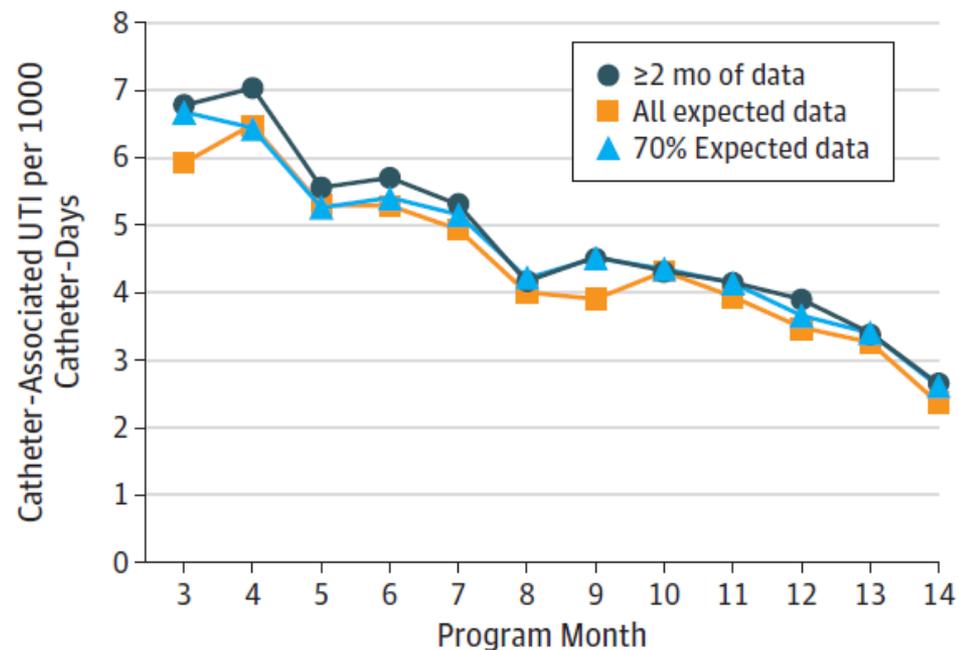
- Residents with urinary catheters
- Residents without urinary catheters
 - Cranberry formulations
 - Functional improvement

A National Implementation Project to Prevent Catheter-Associated Urinary Tract Infection in Nursing Home Residents

Lona Mody, MD, MSc; M. Todd Greene, PhD, MPH; Jennifer Meddings, MD, MSc; Sarah L. Krein, PhD, RN; Sara E. McNamara, MPH, MT(ASCP); Barbara W. Trautner, MD, PhD; David Ratz, MS; Nimalie D. Stone, MD, MS; Lillian Min, MD, MSHS; Steven J. Schweon, RN, MPH, MSN; Andrew J. Rolle, MPH; Russell N. Olmsted, MPH; Dale R. Burwen, MD, MPH; James Battles, PhD; Barbara Edson, RN, MBA, MHA; Sanjay Saint, MD, MPH

- Large implementation project from 2014-2016
- Technical bundle: catheter removal, aseptic insertion, using regular assessments, training for catheter care, and incontinence care planning
- Socioadaptive intervention: enhancing attitudes and behaviors related to IP practices
 - Creating safety teams: engaging leadership, frontline staff, residents
 - Enhancing communication

Figure 2. Catheter-Associated Urinary Tract Infection (UTI) Rates, as Defined by the National Healthcare Safety Network, During the 12-Month Project Period by Data Submission



No. of nursing homes reporting

≥2 mo of data	361	368	376	374	366	361	358	349	337	333	216	193
All expected data	236	236	236	236	236	236	236	236	236	236	148	148
70% Expected data	319	328	335	337	334	332	338	338	326	319	208	182

Infections are a leading cause of illness and death in long-term care facilities.

These infections include catheter-associated urinary tract infections (CAUTIs).

REMEMBER C.A.U.T.I. TO PREVENT CAUTI

<h2>C</h2> <h3>Catheter Removal</h3> <p>Think about catheters in any of your residents. Are the catheters really necessary?</p> <p>Remove the catheter if there is no good indication for it. (See below.)</p> <p>Every resident deserves a chance to be catheter-free and infection-free.</p>	<h2>A</h2> <h3>Aseptic Insertion</h3> <p>Only trained personnel should insert catheters.</p> <p>Use hand hygiene, and insert using aseptic technique.</p> <p>Use the smallest catheter size that will allow good drainage for the resident.</p> <p>Avoid contamination of the catheter.</p> <p>Use catheter securement devices.</p>	<h2>U</h2> <h3>Use Regular Assessments</h3> <p>Insert new urinary catheters only where there is a good indication. Incontinence is NOT an appropriate indication for an indwelling urinary catheter.</p> <p>Consider alternatives to using a urinary catheter.</p> <p>Use a bladder ultrasound to guide management.</p> <p>Implement a process to see whether residents need catheters.</p>	<h2>T</h2> <h3>Training for Catheter Care</h3> <p>Train staff, resident, and family.</p> <p>Maintain a closed drainage system, and maintain unobstructed urine flow.</p> <p>Use routine hygiene. Do not clean the periurethral area with antiseptics.</p> <p>Routine catheter changes, urinalysis, and cultures are not required.</p>	<h2>I</h2> <h3>Incontinence Care Planning</h3> <p>Consider alternatives to using a urinary catheter when developing individual resident care plans and behavioral interventions.</p> <p>Consider timed and prompted voiding and use of a voiding diary.</p>
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Appropriate Indications for an Indwelling Urinary Catheter

To assist in healing of open sacral or perineal wounds in incontinent residents



For acute urinary retention or bladder outlet obstruction

To improve comfort for end-of-life care if needed



Remember: No catheter means no CAUTI!

Source: Centers for Disease Control and Prevention. HealthCare Infection Control Practices Advisory Committee. Guideline for Prevention of Catheter-associated Urinary Tract Infections, 2009. http://www.cdc.gov/hicpac/2009_cau/09_caur.html

The AHRQ Safety Program for Long-Term Care: HAIs/CAUTI provides guides, tools and educational videos that will help you provide safer care for residents. Visit <http://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/cauti-ltc/index.html> for more information.

Tools Available

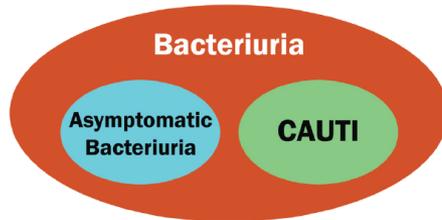
- How to implement an infection prevention quality improvement project
- Improve safety culture
- Engage residents and families
- Practice General Infection Prevention Skills
- Prevent Catheter-Associated Urinary Tract Infection
- Catheter-Associated Urinary Tract Infection Surveillance
- Reduce Unnecessary Urine Culturing and Overuse of Antibiotics

<https://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/cauti-ltc/modules/resources/tools/reduce/4-things.html>

4 Things You Should Know About Urine Cultures

1. **Bacteria** in the urine does **not** necessarily mean a catheter-associated urinary tract infection (CAUTI) is present.

Bacteriuria is the term used to describe a positive urine culture, the presence of bacteria in the urine. This could point to either asymptomatic bacteriuria or to CAUTI. People can have bacteria in the urine that do not cause symptoms or harm; asymptomatic bacteriuria is not a urinary tract infection.

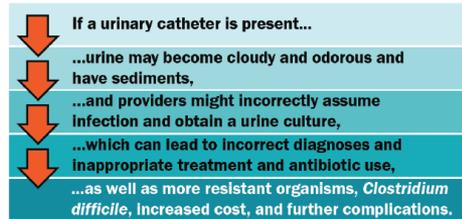


2. Chronically catheterized residents have bacteriuria 99% of the time.

Inappropriate triggers for urine cultures include—

- Urine color
- Urine smell
- Urine sediment
- Cloudy urine
- White blood cells in the urine
- Positive dipstick

3. Urine culturing can actually **harm** residents who have no CAUTI symptoms.



4. Urine cultures should only be ordered if one or more **CAUTI symptoms** are present.

The presence of cloudy, odorous urine with sediments does not alone indicate a CAUTI. CAUTI signs and symptoms are the following:

- Fever (even if the resident has another possible cause for the fever such as pneumonia)*
- Rigors
- New confusion or functional decline (with NO alternative diagnosis AND leukocytosis)
- New suprapubic pain or costovertebral angle pain or tenderness
- New, very low blood pressure (with no alternate noninfectious cause)
- Acute pain, swelling or tenderness of testes, epididymis, or prostate
- Pus around the catheter

* See CDC's January 2016 "Urinary Tract Infection (UTI) Event for Long-term Care Facilities," listed below.



Surveillance

- Diagnostic stewardship
 - catheter days
 - urine cultures / month
 - antibiotic starts /month

What are the results of your efforts to prevent CAUTI? Collect outcome data monthly to find out!

Resident Days

- Every day a resident (with or without a catheter) is in your facility = one resident day.
- Collect at the same time, each day of the month.

Number of Urine Cultures



This includes urine cultures collected for every resident (i.e., with or without catheters) each month.

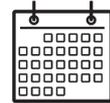
Number of CAUTIs

- CAUTI is counted on the **first day** that the cluster of signs and symptoms, lab reports, and the presence of a catheter for more than 2 consecutive days are found together
- A CAUTI event might continue for days or even weeks, but it is counted **only once, not each consecutive day**
- Note that a resident may have multiple CAUTI events in one month

Catheter Days

Every day a resident has an indwelling urinary catheter = one catheter day.

- Catheter needs to stay in place (i.e., not an in and out catheterization)
- Catheter is through the urethra (i.e., not suprapubic or urostomies)
- Collect at the same time each day of the month



Example:

A facility has seven residents with indwelling urinary catheters for the month of June. During the midnight census the data to the right are collected:

Resident	Days with Catheter
1	30
2	30
3	30
4	10
5	12
6	7
7	4

$$(30 \times 3) + 10 + 12 + 7 + 4 = 123 \text{ catheter days}$$

Remember: Data help you determine your progress!

Toolkit Sections

- **Implementation**

- <https://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/cauti-ltc/implement.html>

- **Sustainability**

- <https://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/cauti-ltc/sustainability.html>

- **Resources**

- <https://www.ahrq.gov/professionals/quality-patient-safety/quality-resources/tools/cauti-ltc/resources.html>

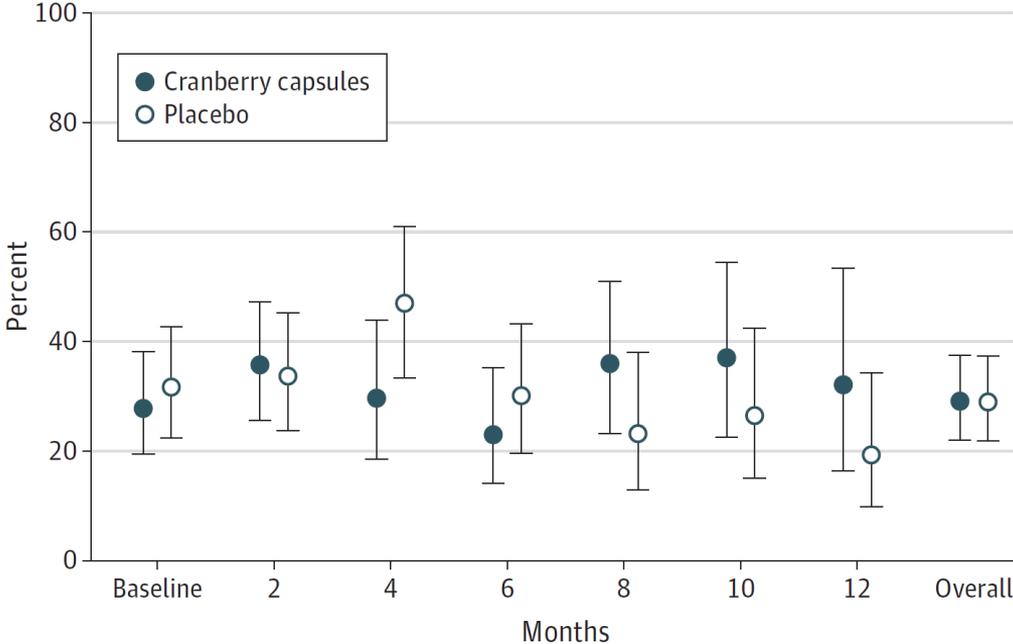
Effect of Cranberry Capsules on Bacteriuria Plus Pyuria Among Older Women in Nursing Homes

A Randomized Clinical Trial

Manisha Juthani-Mehta, MD; Peter H. Van Ness, PhD, MPH; Luann Bianco, BA; Andrea Rink, RN; Sabina Rubeck, MPH; Sandra Ginter, BSN; Stephanie Argraves, MS; Peter Charpentier, MPH; Denise Acampora, MPH; Mark Trentalange, MD, MPH; Vincent Quagliarello, MD; Peter Peduzzi, PhD

- Test the effect of cranberry capsules on reduction of pyuria plus bacteriuria
- Women aged ≥ 65 years in 21 NH
- No difference in incidence of bacteria and pyuria compared with placebo

Figure 2. Bimonthly and Overall Adjusted Percentages of Bacteriuria Plus Pyuria Specimens by Treatment Status (N = 185)



Bottom line on cranberries?

- Probably doesn't hurt
- Provides hydration and calories



Prevention of UTI

- Hydration and nutrition
- Provide good perineal hygiene
- Encourage good voiding habits
- Functional status



Mentes J, "Oral hydration in Older Adults: Am J Nursing 2006: 40-9

Conclusion

- UTIs are common and a significant cause of harm in LTCF
- The actual incidence of UTI in LTCF is unknown
- Evidence based approaches to reducing UTI should be utilized
- Drink up!

Thank you!

For more information, contact CDC
1-800-CDC-INFO (232-4636)
TTY: 1-888-232-6348 www.cdc.gov

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.

