

URINARY TRACT INFECTIONS IN THE ELDERLY

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DISCLAIMER

- ▶ The views and opinions expressed in this lecture are those of this speaker and do not reflect the official policy or position of any agency of the U.S. government

OBJECTIVES

- ▶ Differentiate between asymptomatic bacteruria and UTI
- ▶ Understand risks associated with use of Indwelling Urinary (foley) catheters
- ▶ Learn geriatric “pearls” in identifying, preventing and treating UTIs in elderly
- ▶ Review antibiotic treatment guidelines for UTIs in elderly
- ▶ Discuss techniques in preventing both complicated and uncomplicated UTIs in elderly

UTI EPIDEMIOLOGY IN NURSING HOMES

- ▶ Primary cause of bacteremia in LTC residents is due to UTIs
- ▶ Incidence of symptomatic UTIs in elderly in LTC around 10%
- ▶ Prevalence of asymptomatic bacteriuria in women approx. 30% and 10% in men.
- ▶ Public reporting of catheter use rates in nursing homes over the past 15 years has driven down catheter use markedly.

Why so common?

PHYSIOLOGIC RISK FACTORS FOR UTIS IN THE ELDERLY (1)

Physiologic changes of bladder with aging:

Women: Elevation of vaginal pH due to estrogen deficiency

- results in increased ability of bacteria to adhere to the mucosal cells of the bladder.



Men: Decreased bactericidal activity of prostatic secretions

Increased post-void residual volume of urine

- Cystocele/rectocele
- Prostate hypertrophy
- Neurogenic bladder from comorbidity

ENVIRONMENTAL RISK FACTORS FOR UTI IN THE ELDERLY

Environmental Risk Factors

- ▶ Indwelling urinary catheters
- ▶ Congregate living
- Mechanical/chemical restraints
- Increased exposure to antibiotics
- Poor infection control techniques



The more impaired or frail the greater the risk of UTI!

PHYSIOLOGIC RISK FACTORS FOR UTIS IN THE ELDERLY (2)

Functional / Cognitive Impairment

- ▶ Decrease self care
- ▶ Decrease cues to void
- ▶ Increased incontinence and perineal soiling
- ▶ Difficulty finding bathroom / suitable location to void



RISK FACTORS FOR CAUTI

- ▶ Urinary stasis- below the bladder drainage
- ▶ Over-distention – kinks
- ▶ Urethral trauma – catheter tug
- ▶ Improper handling of urine collection bag
- ▶ Duration of catheter use – biofilm buildup
- ▶ 5% risk per day of catheterization, >30 days universal asymptomatic bacteraemia

CDC NHSN UTI DEFINITIONS

- ▶ Urinary Tract Infection (UTI) aka Acute Uncomplicated Cystitis – infection of the bladder (lower urinary tract).
- ▶ Pyelonephritis – infection of the upper urinary tract (ureters / renal collecting system / kidneys).
- ▶ “Mixed flora” is not considered an organism and cannot be reported.
- ▶ Yeast **cannot** be reported as an organism for a UTI. Urine culture with yeast can be included only if there is at least one qualifying bacterium.

CMS MDS UTI CODING CRITERIA

REVISED OCTOBER 2017

- ▶ **Item I2300 Urinary tract infection (UTI):**
- ▶ The UTI has a look-back period of 30 days for active disease instead of 7 days.
- ▶ **Code only if both of the following are met in the last 30 days:**
- ▶ It was determined that the resident had a UTI using evidence-based criteria such as McGeer, NHSN, or Loeb in the last 30 days,
- ▶ **AND**
- ▶ A physician documented UTI diagnosis (or by a nurse practitioner, physician assistant, or clinical nurse specialist if allowable under state licensure laws) in the last 30 days.

<https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/NursingHomeQualityInits/NHQIMDS30TechnicalInformation.html>

DIAGNOSTIC DILEMMAS FOR OLDER ADULTS WITH UTI

- ▶ Many of the common symptoms (urgency, frequency, incontinence, confusion, falls) occur frequently in this age group.
- ▶ Atypical presenting symptoms may be heralding another illness.
- ▶ Older adults often have a blunted febrile response.
- ▶ Difficulty in obtaining a good history.

EVALUATION OF POSSIBLE UTI

- ▶ Vital signs are essential!
- ▶ Fever is the key in decision to treat!
- ▶ History and examination to rule out other causes of atypical symptoms.
- ▶ U/A and C&S BEFORE starting antibiotics
- ▶ Clean catch vs I&O catheterization.



"Pyuria2011" by James Heilman, MD - Own work. Licensed under CC BY-SA 3.0 via Wikimedia Commons - <http://commons.wikimedia.org/wiki/File:Pyuria2011.JPG#mediaviewer/File:Pyuria2011.JPG>

DIPSTICK URINALYSIS

- ▶ Leukocyte esterase positive (pyuria)
- ▶ Nitrites: positive (bacteriuria)
- ▶ Protein: small amount may be present
- ▶ Blood: small amount may be present

Leukocyte positive: 50–75%

specific; 80-90% sensitive

Pyuria alone not an indication for treatment.



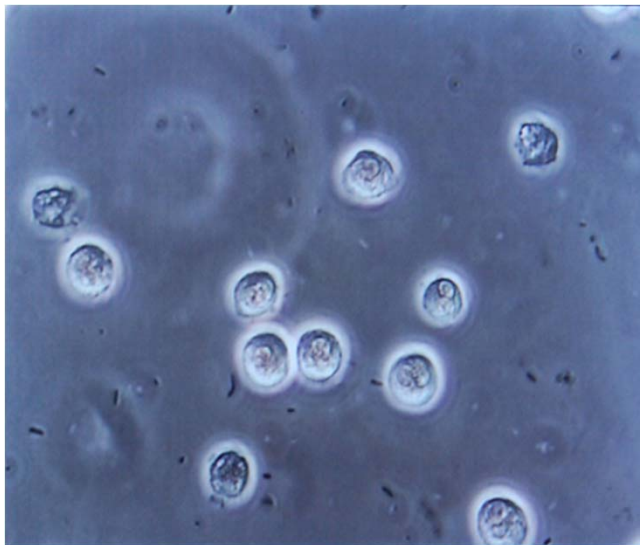
HEMATURIA

- ▶ Not common with UTIs in older adults.
- ▶ Frank hematuria should be evaluated promptly!
- ▶ Causes includes stones, cancer, trauma, **infection** and hemorrhage.



MICROBIOLOGY OF UTI

- ▶ 80% are caused by gram negative bacilli
 - E.coli, Klebsiella, Enterobacter, Proteus, and Serratia
 - Gram positive bacilli - Staphylococcus



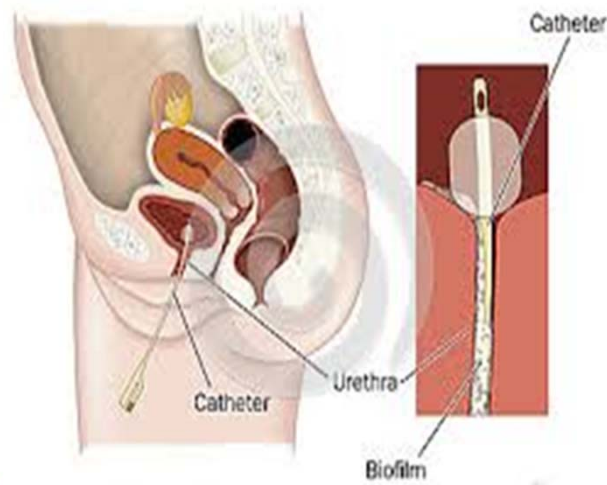
INDWELLING CATHETER-ASSOCIATED UTI (CAUTI)

- ▶ Catheter colonization and infection is inevitable and expected!
- ▶ Once bacteria colonizes urine, concentration is 100,000 colonies within 72 hours!!



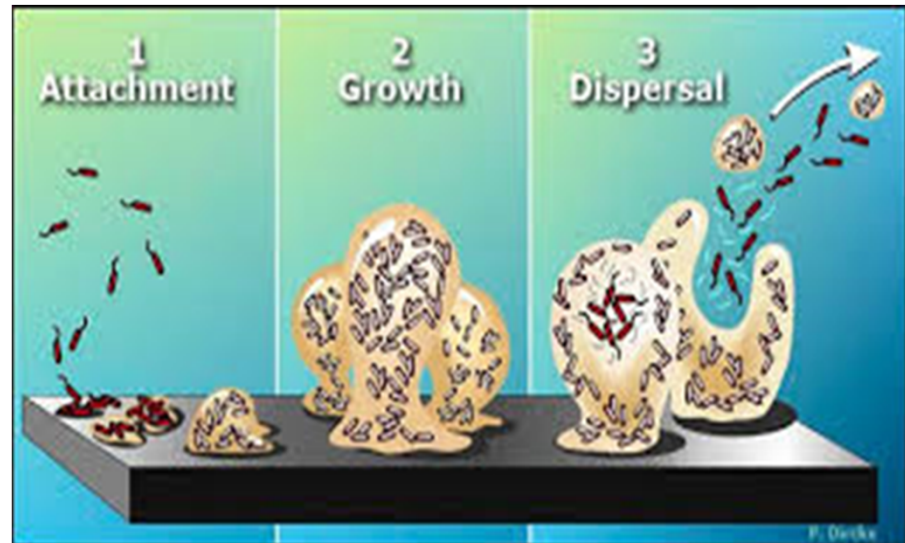
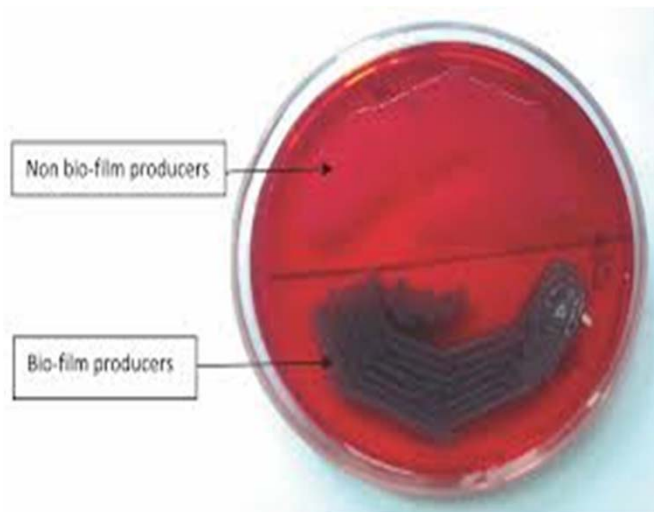
MECHANISMS OF COLONIZATION

- ▶ Colonic and perineal flora primary source
- ▶ Extra-luminal-- women – shorter urethra
- ▶ Manipulation of the collection system
- ▶ From hands of personnel during insertion
- ▶ Ascending from drainage bag/junction



HOW COLONIZATION OCCURS

- ▶ Microbes produce Biofilm on the catheter surface
- ▶ Biofilm is a defense strategy for microbes
- ▶ Protects microbes from body's defenses and antimicrobials!



SPECIMEN COLLECTION

CDC recommends:

- ▶ Obtain urine samples aseptically. (Category IB)
 - ▶ If a small volume of fresh urine is needed for examination (i.e., urinalysis or culture), aspirate the urine from the needleless sampling port with a sterile syringe/cannula adapter after cleansing the port with a disinfectant. (Category IB)
 - ▶ Obtain large volumes of urine for special analyses (not culture) aseptically from the drainage bag. (Category IB)
- ▶ https://www.cdc.gov/hicpac/cauti/02_cauti2009_abbrev.html

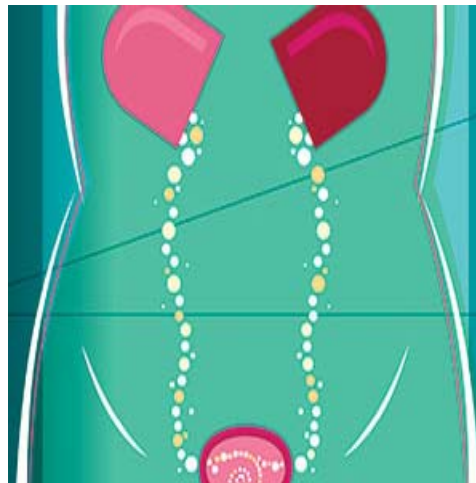
URINE CULTURE

- ▶ Gold STANDARD to guide appropriate treatment
- ▶ Results : >100,000 colonies of one species
- ▶ Treatment can be delayed until cultures results available.
- ▶ Positive culture (bacteriuria) alone **not** a reason to treat.



TREATMENT /NO TREATMENT

- Asymptomatic bacteriuria should NOT be treated.
- Routine or post-treatment screening for bacteriuria is not recommended. (Infectious Diseases Society of America)
- No benefits in decreasing rates of subsequent UTIs
- Increased risk of resistance and uropathogens



CMS UTI ANTIBIOTIC TREATMENT

CMS DNH §483.25(e)(2)(i)

Minimum criteria for initiating antibiotics for an indication of urinary tract infection were considered for residents with no indwelling urinary catheters and for residents with chronic indwelling catheters.

1. NO indwelling catheter, include: acute dysuria alone or fever ($>37.9^{\circ}\text{C}$ [100°F] or 1.5°C [2.4°F] increase above baseline temperature) and at least one of the following:

- new or worsening urgency, frequency, suprapubic pain, gross hematuria, costovertebral angle tenderness, or urinary incontinence.

2. Chronic indwelling catheter (indwelling Foley catheter or a suprapubic catheter), includes the presence of at least one of the following:

- ▶ fever ($>37.9^{\circ}\text{C}$ [100°F] or 1.5°C [2.4°F] increase above baseline temperature),
- ▶ new costovertebral tenderness, rigors (shaking chills) with or without identified cause, or new onset of delirium.”

Reference - “Development of Minimum Criteria for the Initiation of Antibiotics in Residents of Long-Term-Care Facilities: Results of a Consensus Conference” - Infect Control Hosp Epidemiol 2001;22:120-124.

REGULATION: F 690 (FORMERLY F315)

- ▶ **§483.25(d) Urinary Incontinence**
- ▶ *Based on the resident's comprehensive assessment, the facility must ensure that --*
- ▶ *§483.25(d) (1) A resident who enters the facility without an indwelling catheter is not catheterized unless the resident's clinical condition demonstrates that catheterization was necessary; and*
- ▶ *§483.25(d) (2) A resident who is incontinent of bladder receives appropriate treatment and services to prevent urinary tract infections and to restore as much normal bladder function as possible.*

INTERMITTENT CATHETERIZATION

- ▶ Intermittent catheterization can often manage overflow incontinence effectively.
- ▶ New onset incontinence from a transient, hypotonic/atonic bladder (usually seen following indwelling catheterization in the hospital) may benefit from intermittent bladder catheterization until the bladder tone returns (e.g., up to approximately 7 days).
- ▶ A voiding trial and post void residual can help identify when bladder tone has returned.

APPROPRIATE USE OF URINARY CATHETERS

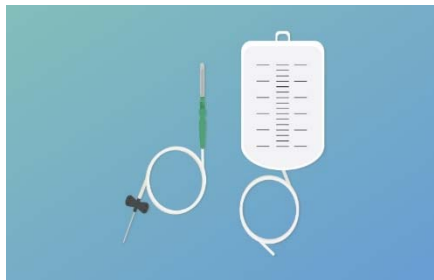
- ▶ Clinical criteria for long/short for indwelling catheter:
 - ▶ Obstruction
 - ▶ Neurogenic bladder
 - ▶ Hematuria (short term)
 - ▶ Surgery (short term)
 - ▶ Wounds stage 3 or >
 - ▶ Aggressive diuresis / monitoring of strict I/O (short term)
 - ▶ Terminally ill for comfort measures
- ▶ Develop policies for independent nursing removal and education on technique for placement and management of device and collecting bag
- ▶ CDC HICPAC Guidelines for Prevention of Catheter-Associated Urinary Tract Infections, 2009.

INAPPROPRIATE USE OF URINARY CATHETERS

- ▶ Used for the convenience of nursing staff.
- ▶ Used in lieu of other bladder management strategies.
- ▶ Used for specimen collection when the resident can voluntarily void
- ▶ Catheter left in place when removal is indicated.

(Indwelling catheters are associated with a 5% risk/day)

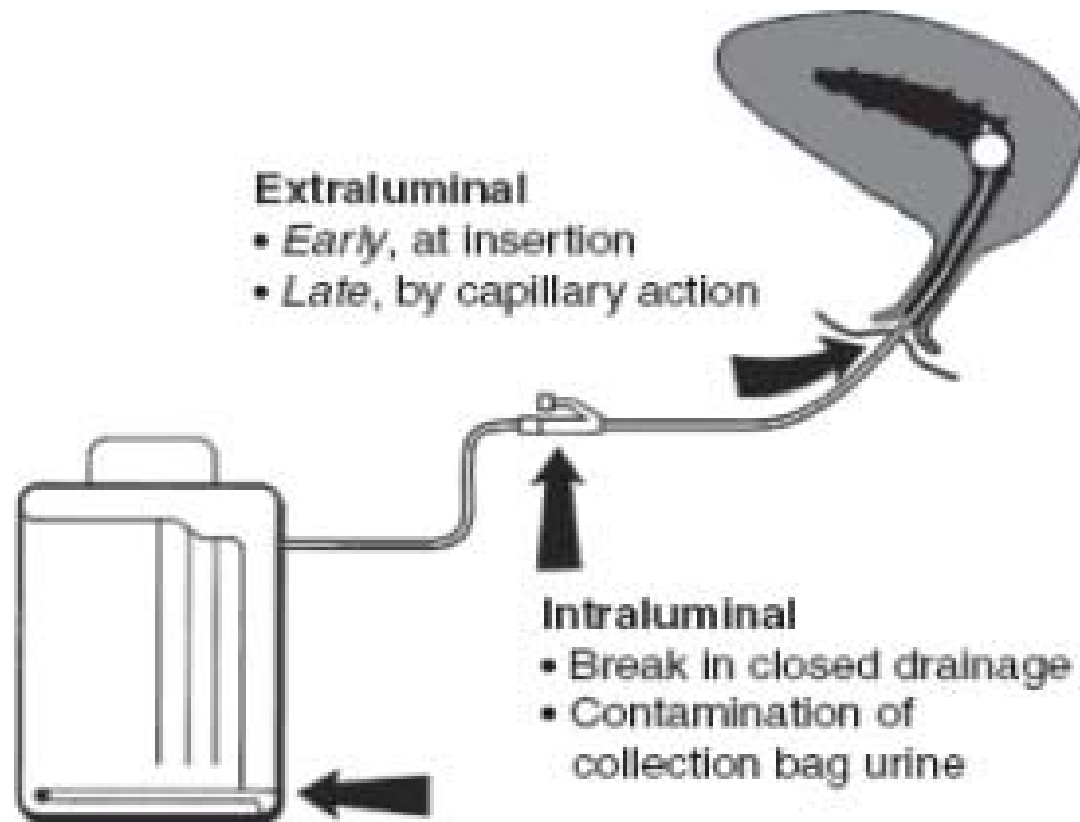
CDCC HICPAC Guidelines for Prevention of Catheter Associated Urinary Tract Infections 2009



PREVENTION OF UTIS

- ▶ Hand Hygiene – both residents and staff
- ▶ Adequate hydration – 30cc/kg of body weight/day
- ▶ Perineal hygiene after toileting
- ▶ Routine toileting
- ▶ *Removing urinary catheter as early as possible.*

ROUTES OF ENTRY OF UROPATHOGENS TO CATHETERIZED URINARY TRACT



Source: Maki and Tambyah (2001)

PREVENTION CATHETER-ASSOCIATED UTI (1)

- ▶ Catheter used for appropriate indications.
- ▶ Urinary catheter duration of use minimized.

Increase of 5% risk per day!



- ▶ Hand hygiene before and after insertion of catheter and during any manipulation.
- ▶ Only properly trained persons for insertion using aseptic technique.

CDC HICPAC Guidelines for Prevention of Catheter Associated Urinary Tract Infections 2009

PREVENTION OF CATHETER-ASSOCIATED UTI (2)

CDC HICPAC GUIDELINES FOR PREVENTION OF CATHETER ASSOCIATED URINARY TRACT INFECTIONS 2009

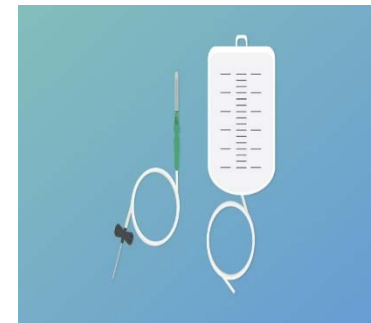
- ▶ Catheter properly secured to prevent urethral traction.
- ▶ Closed drainage system maintained.
- ▶ Unobstructed urine flow maintained.
- ▶ Collecting bag emptied regularly; using a separate clean collecting container for each resident.



PREVENTION OF CATHETER-ASSOCIATED UTI(3)

CDC HICPAC GUIDELINES FOR PREVENTION OF CATHETER ASSOCIATED URINARY TRACT INFECTIONS 2009

- ▶ Clean technique for intermittent catheterization.
- ▶ Standard Precautions during catheter manipulation.
- ▶ Periurethral cleaning with antiseptics not recommended. Routine hygiene recommended.
- ▶ Routine use of antimicrobial/antiseptic-impregnated catheters not recommended.



PREVENTION OF CATHETER-ASSOCIATED UTI(4)

CDC HICPAC GUIDELINES FOR PREVENTION OF CATHETER ASSOCIATED URINARY TRACT INFECTIONS 2009

- ▶ No routine schedule for catheter replacement (e.g. monthly)
- ▶ If obstruction occurs - change the catheter.
- ▶ Urine samples obtained aseptically.

Note: Before urine samples for culture are obtained from resident with a catheter in place > 14 days, catheter should be replaced and specimen obtained from new catheter.

PREVENTION OF CATHETER-ASSOCIATED UTI(5)

CDC HICPAC GUIDELINES FOR PREVENTION OF CATHETER ASSOCIATED URINARY TRACT INFECTIONS 2009

- ▶ Quality Improvement Programs – based on facility risk assessment.
- ▶ QI Program should: assure utilization, daily need review, adherence to hand hygiene, care of catheters.
 - system of reminders of residents with catheters
 - guidelines and protocols for nurse-directed removal of unnecessary catheters.
 - Education and performance feedback of staff.
- ▶ Administrative Infrastructure – use of evidence based guidelines, monitoring adherence, and education and training, ensuring supplies available and surveillance resources.

PROPHYLAXIS FOR UTI PREVENTION

- ▶ Cranberry juice/extract – currently not enough evidence to recommend for or against use. Cochrane guidelines found no strong evidence for recommending use in prophylaxis (2012).



- ▶ Oral Estrogens **not** shown to be beneficial.
- ▶ Topical, vaginally applied estrogens have been shown to be effective in smaller studies (sample was post-menopausal).



STUDY FINDS LITTLE CONSISTENCY FOR UTI PREVENTION IN NURSING HOMES (1)

Center for Health Policy at Columbia University School of Nursing surveyed nursing homes across the U.S. in 2014.

955 nursing homes with 88,135 residents were linked to CMS infection data.

- ▶ 5.4%+ of 4,700 nursing home residents-suffered a UTI every month.
- ▶ Residents with a catheter were 4X more likely to get a UTI than no catheter.
- ▶ However, more infections were not associated with catheter use than those that were.

Ref. Stone P. et al. Presented at the APIC Annual Educational Conference, Charlotte, NC. 2016.

STUDY FINDS LITTLE CONSISTENCY FOR UTI PREVENTION IN NURSING HOMES (2)

Examined 9 UTI prevention policies and found the following nursing homes policies were associated with lower infection prevalence:

- Policy for portable bladder ultrasound scanners were 10% less likely to have high rates of UTIs that were not associated with catheter use. Only 22% of surveyed facilities had this policy.
- ▶ Policy for cleaning the urine collection bag attached to the resident's leg were 20% less likely to have high rates of catheter-associated UTIs. Only 44% of surveyed facilities had this policy.
- If Infection preventionist (IP) on staff who took a national course through APIC were 20% less likely to have high rates of UTIs. Only 9% of respondents had taken an APIC training course.

Ref. Stone et al.

AGENCY FOR HEALTHCARE RESEARCH AND QUALITY (AHRQ) UTI PREVENTION PROJECT (1)

- ▶ Toolkit to help staff understand — and effectively and consistently use — proven infection-prevention practices and usage best practices.
- ▶ Results: CAUTIS fell 54% in 404 nursing homes in 38 states;
6.4 to 3.33 CAUTIs per 1,000 catheter-days.
- ▶ 75% of nursing homes had 40% decrease — even as usage rates held steady (about 4.5 percent of patients in the nursing homes used catheters);
- ▶ Number of lab tests clinicians ordered to check patients for infections decreased 15%.

Lona Mody, MD, MSc., JAMA Internal Medicine

AGENCY FOR HEALTHCARE RESEARCH AND QUALITY (AHRQ) UTI PREVENTION PROJECT(2)

- ▶ Monthly content training and coaching calls by project team.
Behavior staff training for catheter indications, catheter maintenance, laboratory testing indications, antibiotics, communication strategies.
- ▶ Urine lab cultures were performed 3.52 times for every 1,000 patient days at the start of the project but went down to 3.09 per 1,000 - preventing false-positives.
- ▶ Instead of relying on urine culture results, staff received education to help them recognize the early symptoms of a UTI, including in people with dementia who cannot always communicate that they are experiencing pain or burning during urination.

UNC UTI PREVENTION VIDEO

- ▶ From the Nursing Home Infection Prevention Courses by The University of North Carolina at Chapel Hill develop by SPICE.
- ▶ Infection Prevention in Nursing Homes Video for staff training.
- ▶ <https://www.coursera.org/learn/infection-prevention/lecture/ugBjg/infection-prevention-in-nursing-homes-introduction>

SUMMARY OF UTI/CAUTI

- ▶ Prevent Infection – unnecessary catheters removed (early on)!
- ▶ Colonization (the positive culture) should NOT be treated.
- ▶ Pyuria alone is not enough to make diagnosis of UTI
- ▶ Antibiotics should not be used to treat asymptomatic UTIs in LTCFs.
- ▶ Do not culture after completing antibiotic course.

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