

Long-term Care Antibiotic Stewardship

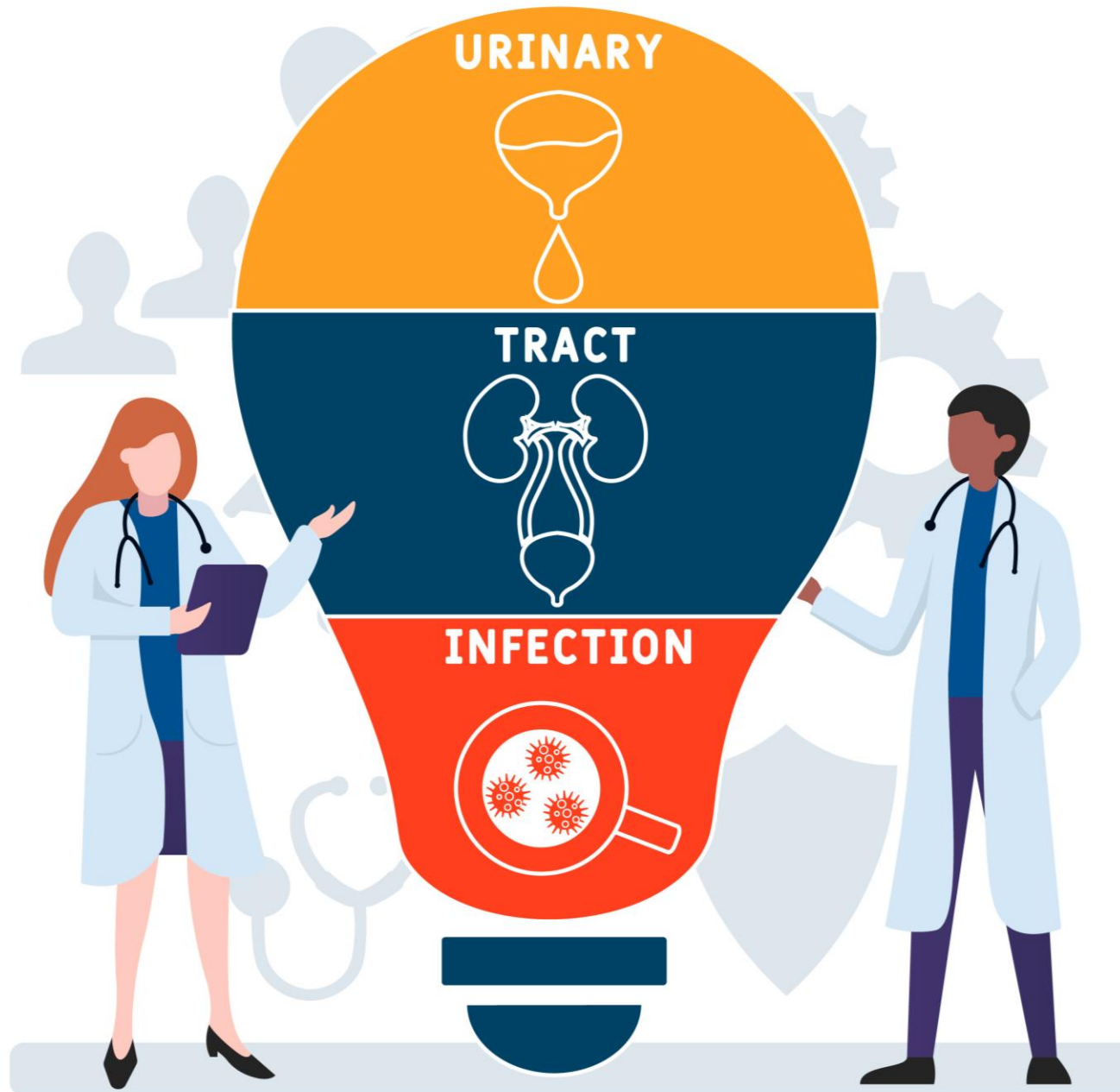
Session 1

Initiatives for the Prevention and Treatment of Urinary Tract Infections and Improved Awareness of Sexually Transmitted Infections

June 15, 2023

Presentation Recording:

<https://youtu.be/47Rj9xY-GD4>



Presenter

Kellie Wark, MD, MPH

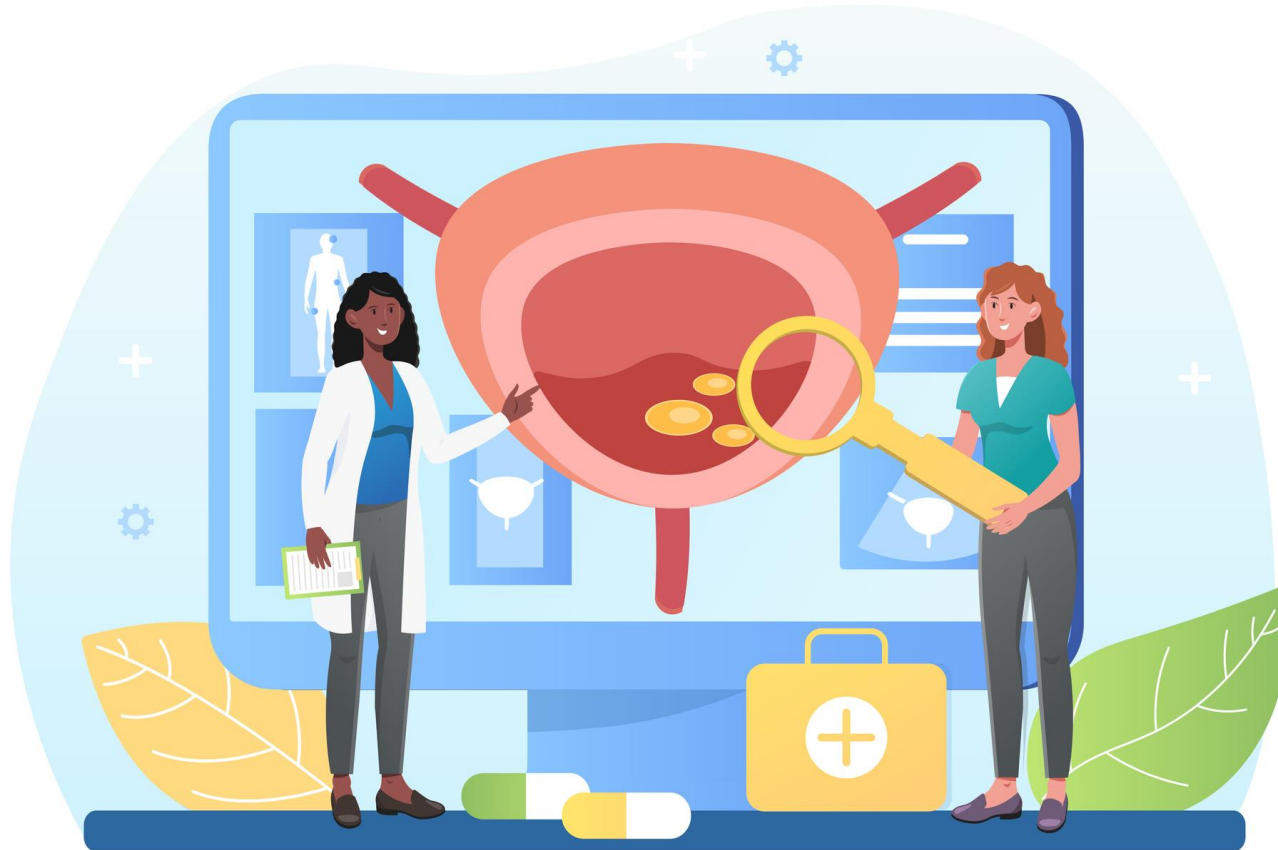
Antimicrobial Stewardship Lead

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Objectives



- Review the epidemiology and pathogenesis of urinary tract infections (UTIs), catheter associated urinary tract infections (CAUTIs) and asymptomatic bacteriuria (ASB)
- Compare CAUTI prevention strategies
- Formulate facility treatment guidelines
- Examine diagnostic stewardship pitfalls
- Compare syphilis, gonorrhea, chlamydia epidemiology and trends in the elderly and long-term care populations
- Identify methods to improve sexually transmitted infections (STIs) screening

Polling Question

Which population has the greatest proportion of asymptomatic bacteriuria?

- A. Diabetic Females
- B. Men in long-term care facilities
- C. Patients performing clean-intermittent catheterization
- D. Patients with indwelling long-term urinary catheters

Polling Question

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- D. **Patients with indwelling long-term urinary catheters**

Asymptomatic Bacteriuria

Who to Screen?

- ✓ Pregnant (“early visits”) (treatment = 4-7 days)
- ✓ Before urologic interventions (treatment = 1-2 dose)
- ✗ Neutropenic patients
- ✗ Kidney transplant patients
- ✗ Solid organ transplant recipients
- ✗ Non-urologic surgeries
- ✗ **Indwelling catheters**
- ✗ **Elderly with falls**
- ✗ **Elderly with confusion** (rule out alternative causes)

Definition

Bacteria in
urine
no
symptoms



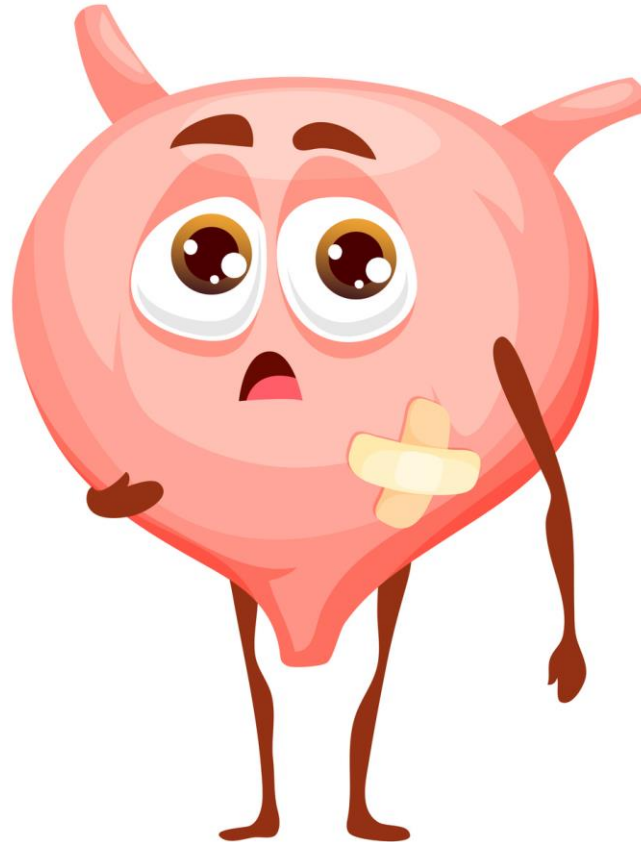
Asymptomatic Bacteriuria

Prevalence of asymptomatic bacteriuria in selected populations	
Population	Prevalence
Healthy premenopausal women	1.0 - 5.0 %
Pregnant women	1.9 - 9.5 %
Post-menopausal women aged 50-70	2.8 - 16 %
Diabetic women	9.0 - 27.0 %
Diabetic men	0.7 - 11.0 %
Patients on hemodialysis	28 %
Women in LTC	25 - 50 %
Men in LTC	15 - 40 %
Patients performing clean intermittent catheterization (CIC)	23 - 89 %
Patients with indwelling short-term catheter	9 - 23 %
Patients with indwelling long-term catheter	100 %

Cystitis

Describes Syndrome of:

- Dysuria
- Frequency
- Urgency
- Suprapubic tenderness



Inflammation Caused by:

- Infections (that is a UTI)
- Urethritis (gonorrhea, chlamydia)
- Interstitial cystitis
- Stones
- Glomerulonephritis
- Instrumentation

Rarely fevers, back or flank pain (think kidney if this happens)

Urinary Symptoms = Many Causes

Symptoms and Various Causes		
Dysuria, Urgency, Frequency,	Flank/back pain, Fevers	Smelly Urine
UTI	Pyelonephritis	UTI (if no other symptoms = Nope)
Urethritis (men > women)	Obstruction (hydronephrosis)	Foods (asparagus, brussel sprouts, fish, onions, garlic, coffee)
Vaginitis (dryness, estrogen)	Renal infarct	Liver disorder (ammonia)
Interstitial cystitis	Stones	Dehydration
Stones		Diabetes Yeast infection
Pelvic floor dysfunction Overactive bladder		Meds (sulfa, diabetic, rheumatoid meds, azathioprine)
STI		Kidney stones

Urinary Tract Infection

Risk Factors

- Sex (alters vaginal flora)
- Diaphragms (blocks urine)
- Spermicides
- Estrogen deficiency (lose vaginal lactobacilli)
- Uncircumcised
- Stones
- Pregnancy
- Diabetes
- Functional or mental impairment
- Incontinence
- Bladder prolapse
- Neurogenic bladder
- Catheterization

Urinary Tract Infection

Predictive Value of Symptoms +/- Pyuria, Nitrituria	
Symptom	Likelihood Ratio (95% Confidence Interval)
Burning	1.09 (0.97 - 1.22)
Urgency	1.29 (1.12 - 1.50)
Frequency	1.16 (1.06 - 1.28)
Painful voiding	1.31 (1.12-1.54)
Nocturnal incontinence	0.93 (0.68 - 1.29)
2 Concurrent symptoms	1.04 (0.92 - 1.18)
Symptoms + UA WBCs	1.67 (1.39 - 2.01)
Symptoms + UA nitrate	5.41 (3.19 - 9.18)
Symptoms + UA WBC + nitrate	7.52 (3.84 - 14.73)

Urine Dipstick vs Urinalysis

Test



Dipstick



Urinalysis

Definition

- Urine sampled by dipping paper strip into urine

- Urine test analyzed by variety of parameters

Method

- Dip strip paper into urine

- Urine appearance, content, concentration

Analysis

- Change of color on strip

- Cloudy or clear urine solution
- Presence of substances (protein, blood, glucose)

Components

- Reagent strip (chemical analysis)

- Macroscopic (appearance, clarity)
- Reagent strip (chemical)
- Microscopic (WBC, squamous)

Advantage

- Fast
- Cheap

- Cheap
- More details

Urine Dipstick vs Urinalysis

Dipstick

- Nitrites = poor predictor of pathogen **type**
 - PPV 5% gram positive, 49% gram negative
- Nitrites + WBC +LE = poor predictor infection
 - PPV 76% for UTI
- Leukocyte esterase = poor predictor pyuria
 - PPV 18-75% for UTI



Nitrite - nitrate reductase (in gram negatives)

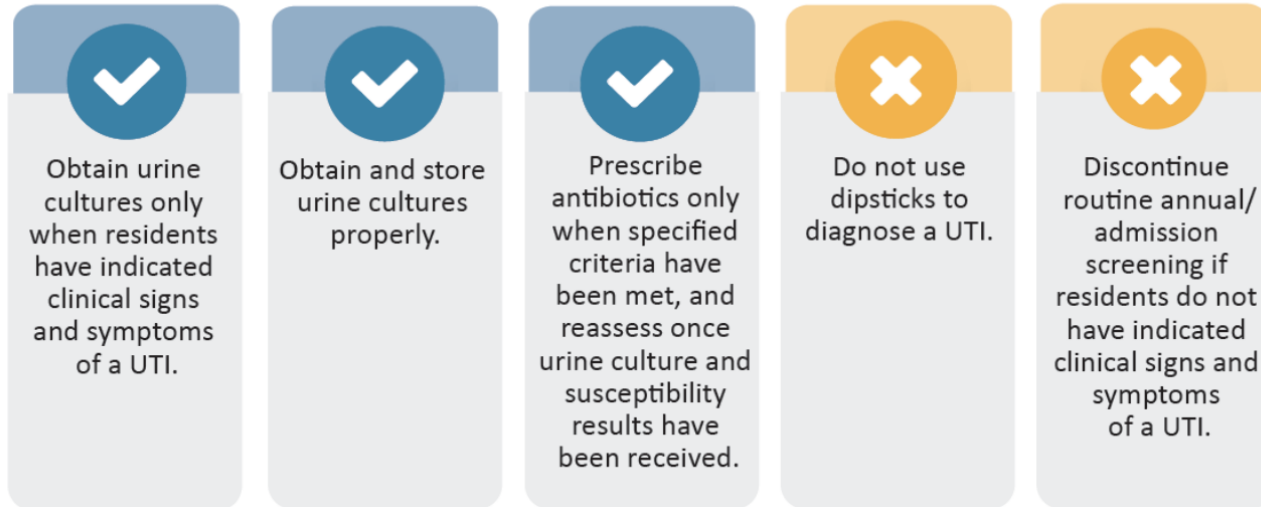
- False positives: colored urine, in-vitro growth
- False negatives: gram positive (Example: enterococcus, staph), vitamin C

Leukocyte esterase (LE) - released from lysed neutrophils

- False positives: colored urine (beets, bilirubinemia)
- False negatives: vitamin C, protein, glucose, mucus, cephalosporins, nitrofurantoin, boric acid

Urine Dipstick Problems

The UTI Program: Five Practice Changes



1st Revision: November 2019

Urinary Tract Infection (UTI) Program Evidence to Support Discontinuing the Use of Dipsticks to Diagnose a UTI in Residents of Long-Term Care Homes (LTCHs)

Change is not possible without first getting buy-in for the practice changes. This resource reviews the literature on the use of dipsticks in this population. It supports one of the five practice changes: to avoid using dipsticks to diagnose UTIs in residents of LTCHs.

This resource is part of Public Health Ontario's [UTI Program](#). For more information, please visit publichealthontario.ca/UTI or email UTI@oahpp.ca.

More Information

publichealthontario.ca/-/media/Documents/U/2016/uti-dipsticks.pdf?rev=62d9e33717c3419e805dbe963d527619&sc_lang=en&hash=93ED30295AF855951B5BF77C543F22F4

The use of dipsticks as a screening tool in suspected UTIs in the elderly is NOT recommended.
An extensive literature review has led to the following conclusions:

- Dipstick tests with negative results for both nitrites and leukocyte esterase have a high negative predictive value and can be used to *rule out* a UTI.
- Dipstick tests cannot be used to diagnose a UTI. A dipstick test that is positive for nitrites, leukocyte esterase or both is not predictive of infection. The presence of clinical symptoms of a UTI and a positive culture and susceptibility test are required for a UTI diagnosis.

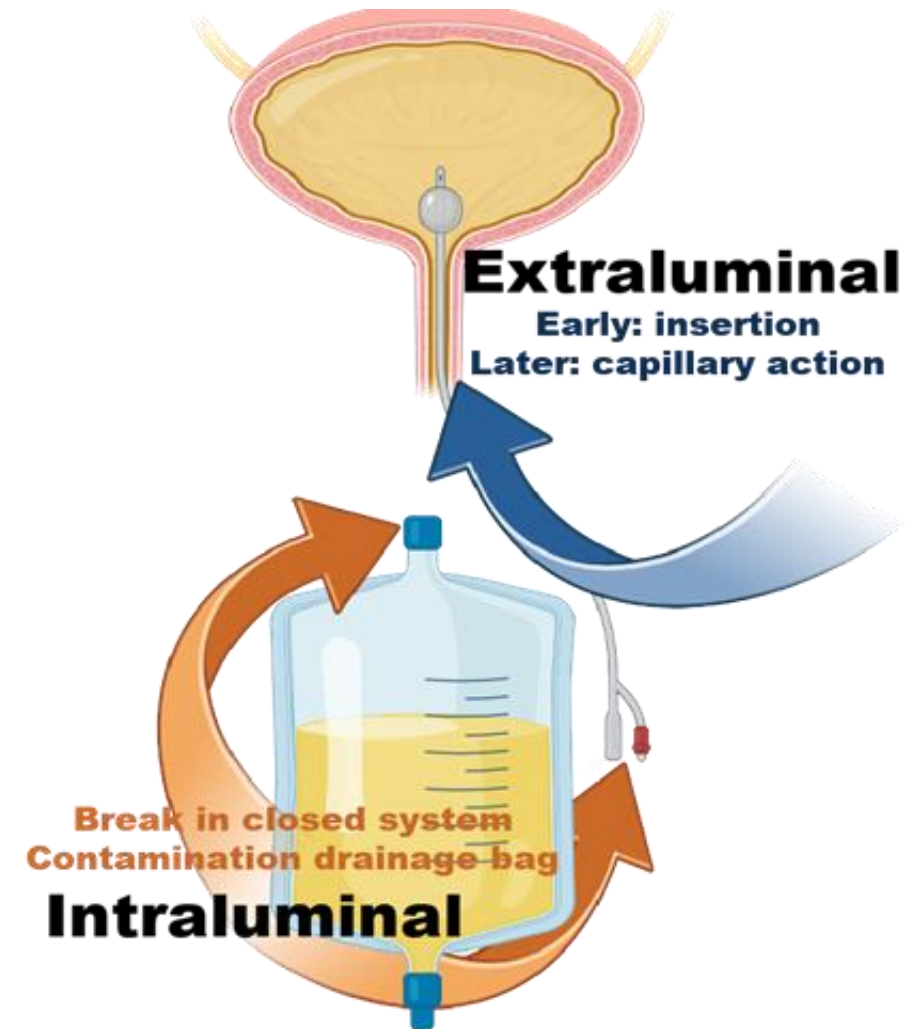
Catheter Associated Urinary Tract Infection

Definition

- Indwelling catheter in place >2 days
- Symptoms of infection
- Culture >100,000 CFU with no more than 2 orgs

Pathogenesis

- Colonic or perineal bacteria or hands of HCP during insertion or manipulation → bacteria enter bladder via **extraluminal surface (2/3)** or the **intraluminal (1/3)**, residual indwelling catheter urine serves as reservoir for bacterial growth



Polling Question

True or False: By day 30 of indwelling urinary catheter, nearly all are colonized with bacteria?

A. True

B. False

Polling Question

True or False: By day 30 of indwelling urinary catheter, nearly all are colonized with bacteria?

A. **True**

B. False

Catheter Associated Urinary Tract Infection



Epidemiology

Daily risk of CA-bacteriuria:
3-10% per day

By day 30=100%

3-32% CA-funguria

75-90% are asymptomatic

Polling Question

Long-term use of indwelling urinary catheters are associated with which of the following?

- A. Urinary and/or kidney stone formation
- B. Urinary tract infections
- C. Incontinence
- D. Bladder cancer
- E. All of the above

Polling Question

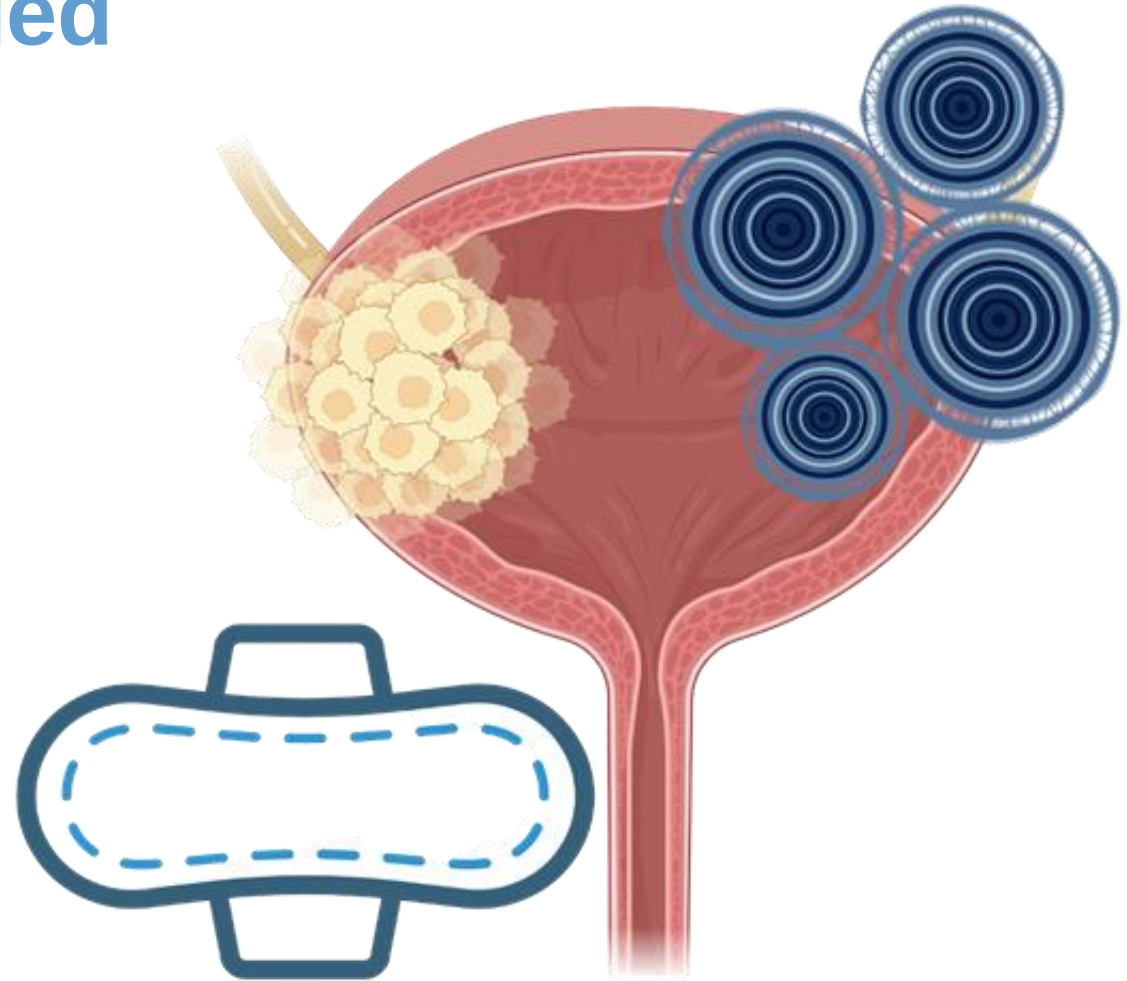
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- A. Urinary and/or kidney stone formation
- B. Urinary tract infections
- C. Incontinence
- D. Bladder cancer
- E. **All of the above**

Urinary Catheters

Risks associated with prolonged urinary catheters:

- Increased stone formation
- Urease-producers (that is proteus)
- Local GU infections, fistulas
- Bladder cancer
- Incontinence



Assess Need for Urinary Catheters

Category

Common Causes of Urinary Retention

Neurologic



- Spinal cord injury
- Cord compression
- Multiple sclerosis
- Cerebral palsy

Medication



- Antidepressants (TCA)
- Antipsychotics (haldol)
- Opioids
- Diphenhydramine (benadryl)

Obstruction



- Enlarged prostate
- Prostate cancer
- Bladder stones
- Fecal impaction

Infection



- Urinary tract infection
- Prostatitis
- Prostate abscess
- Vulvovaginitis

Differential Common Causes of Incontinence

D

- Delirium/dementia

I

- Infection

A

- Atrophic vaginitis
- Atonic bladder

P

- Pharmacologic (diuretics)

P

- Psychologic (depression)

E

- Endocrine (diabetes)
- Excess fluid or urine output

R

- Restricted mobility

S

- Stool impaction

Stress Incontinence



- Loss of urine on exertion (cough, sneeze, activity)
- Medications
- Prostate issues
- Spinal cord injury

Urge Incontinence



- Involuntary loss of urine
- Associated urgency
- Bladder outlet obstruction
- Prostate hyperplasia (BPH)

Medications

- Diuretics
- Caffeine
- Alcohol
- ACE inhibitors
- Anti-histamines
- Opioids
- Antipsychotics
- Muscle relaxants
- Sedatives
- NSAIDS

CAUTI Prevention Best Practices

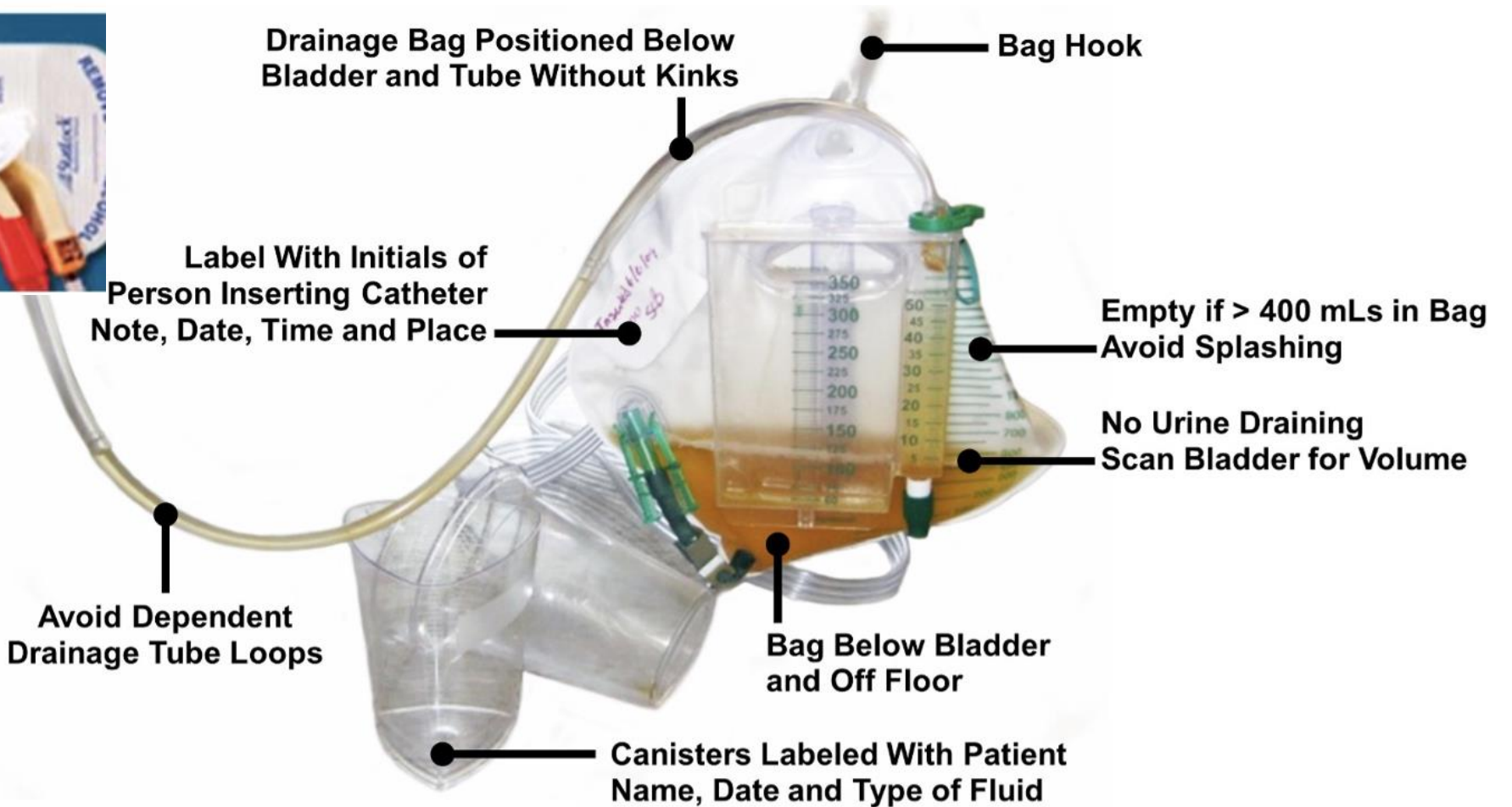
Catheter Anchor/Securement Device at Bifurcation



Needleless Sampling Port for Urine Collection



Tamper-Resistant Seal Maintains Closed System



Assessment Tools

AHRQ Safety Program for Long-Term Care: HAIs/CAUTI Sustainability Assessment Tool

Instructions for completion: Read each statement below and assign a rating from 1 to 5 (1 = Strongly disagree and 5 = Strongly agree) that best depicts your team. If you are not able to answer the question assign a rating of 0 (zero). The spreadsheet will auto-calculate the subtotal for each domain and average the score (e.g. Environmental Support total score of 21 is 21/6 equals an average score of 3.5). The average score will also auto-populate in the results section to identify barriers and opportunities for improvement.

I. Environmental Support	Score (0-5)	IV. Process Improvement	Score (0-5)
Champions exist who strongly support the program.	4	The team has a process in place to monitor and track infections, and examine why they occurred. ⁴	
The program has leadership support from within the organization.	5	The team reports short term and intermediate outcomes to leadership and/or family/resident council.	
The program has strong staff support.	5	The facility has plans in place to routinely assess safety culture amongst team members. ⁵	
The program has strong resident/family stakeholder support.	3	The team adapts strategies as needed.	
The team has improved communication strategies to increase awareness of CAUTI.	3		
The team has improved communication strategies to increase awareness of safety culture.	2		
TOTAL	22	TOTAL	0
Average Score	3.666667	Average Score	0

II. Organizational Capacity	Score (0-5)	V. Strategic Planning	Score (0-5)
The program is well integrated into the operations of the organization.		The program has a sustainability plan.	
Organizational systems are in place to support the various program needs.		The program's goals for CAUTI prevention/reduction are understood by all stakeholders.	
Leadership efficiently manages staff and other resources.		The facility is committed to maintaining a culture of safety.	
The program has adequate teaching and coaching resources.		The program clearly outlines roles and responsibilities.	

Download

ahrq.gov/sites/default/files/wysiwyg/professionals/quality-patient-safety/quality-resources/tools/cauti-ltc/modules/sustainability/sustainability-assesment-tool.xlsx

Sample SBAR Tool for Suspected Urinary Tract Infection

[Facility Logo]		Resident Label		
S	Situation I am concerned about a suspected UTI for the above resident.			
B	Background Indwelling catheter ☐ Yes ☐ No If yes, ☐ Urethral ☐ Suprapubic Incontinence ☐ Yes ☐ No If yes, is this new or worsening ☐ Yes ☐ No UTI in last 6 months ☐ Yes ☐ No If yes, Date: _____ Organism: _____ Treatment: _____ Active diagnosis (especially bladder, kidney, genitourinary conditions; diabetes; receiving dialysis, anticoagulants): _____ Advance directives for limiting treatment (especially antibiotic use): _____ Medication allergies: _____			
A	Assessment Vital signs: BP _____ / _____ HR _____ Resp. rate _____ Temp. _____ O ₂ Sats. _____ <table border="1"> <tr> <td> Resident WITH indwelling catheter The criteria are met to initiate antibiotics if one of the following are selected: No Yes ☐ ☐ Fever of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C) ☐ ☐ New back or flank pain ☐ ☐ Rigors / shaking / chills ☐ ☐ New onset delirium (new dramatic change in mental status) ☐ ☐ Hypotension (significant change in baseline BP or SBP <90) ☐ ☐ Acute suprapubic pain ☐ ☐ Acute pain, swelling or tenderness of the scrotal area </td> <td> Resident WITHOUT indwelling catheter Criteria are met to initiate antibiotics if one of the three situations are met: No Yes ☐ ☐ Any one of the following two: ☐ Acute dysuria alone (pain or burning while urinating) ☐ Acute pain, swelling or tenderness of the scrotal area OR ☐ ☐ Single temp of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C) and at least one of the following new or worsening symptoms: ☐ Urgency ☐ Suprapubic pain ☐ Frequency ☐ Gross hematuria ☐ Back or flank pain ☐ Urinary incontinence OR ☐ ☐ No fever, but two or more of the following new or worsening symptoms: ☐ Urgency ☐ Suprapubic pain ☐ Frequency ☐ Gross hematuria ☐ Urinary incontinence </td> </tr> </table>		Resident WITH indwelling catheter The criteria are met to initiate antibiotics if one of the following are selected: No Yes ☐ ☐ Fever of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C) ☐ ☐ New back or flank pain ☐ ☐ Rigors / shaking / chills ☐ ☐ New onset delirium (new dramatic change in mental status) ☐ ☐ Hypotension (significant change in baseline BP or SBP <90) ☐ ☐ Acute suprapubic pain ☐ ☐ Acute pain, swelling or tenderness of the scrotal area	Resident WITHOUT indwelling catheter Criteria are met to initiate antibiotics if one of the three situations are met: No Yes ☐ ☐ Any one of the following two: ☐ Acute dysuria alone (pain or burning while urinating) ☐ Acute pain, swelling or tenderness of the scrotal area OR ☐ ☐ Single temp of 100°F (38°C), or 2°F (1.1°C) above baseline, or repeated temperatures of 99°F (37°C) and at least one of the following new or worsening symptoms: ☐ Urgency ☐ Suprapubic pain ☐ Frequency ☐ Gross hematuria ☐ Back or flank pain ☐ Urinary incontinence OR ☐ ☐ No fever, but two or more of the following new or worsening symptoms: ☐ Urgency ☐ Suprapubic pain ☐ Frequency ☐ Gross hematuria ☐ Urinary incontinence
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R	Recommendation ☐ Protocol criteria met. Resident may require UA and urine culture or an antibiotic. ☐ Protocol criteria are NOT met. Resident DOES NOT need immediate antibiotic but may need additional observation. Nurse's Signature: _____ Date/Time: _____ ☐ Notification of Family/POA Name: _____ Date/Time: _____ ☐ Faxed or ☐ Called to: _____ Date/Time: _____			

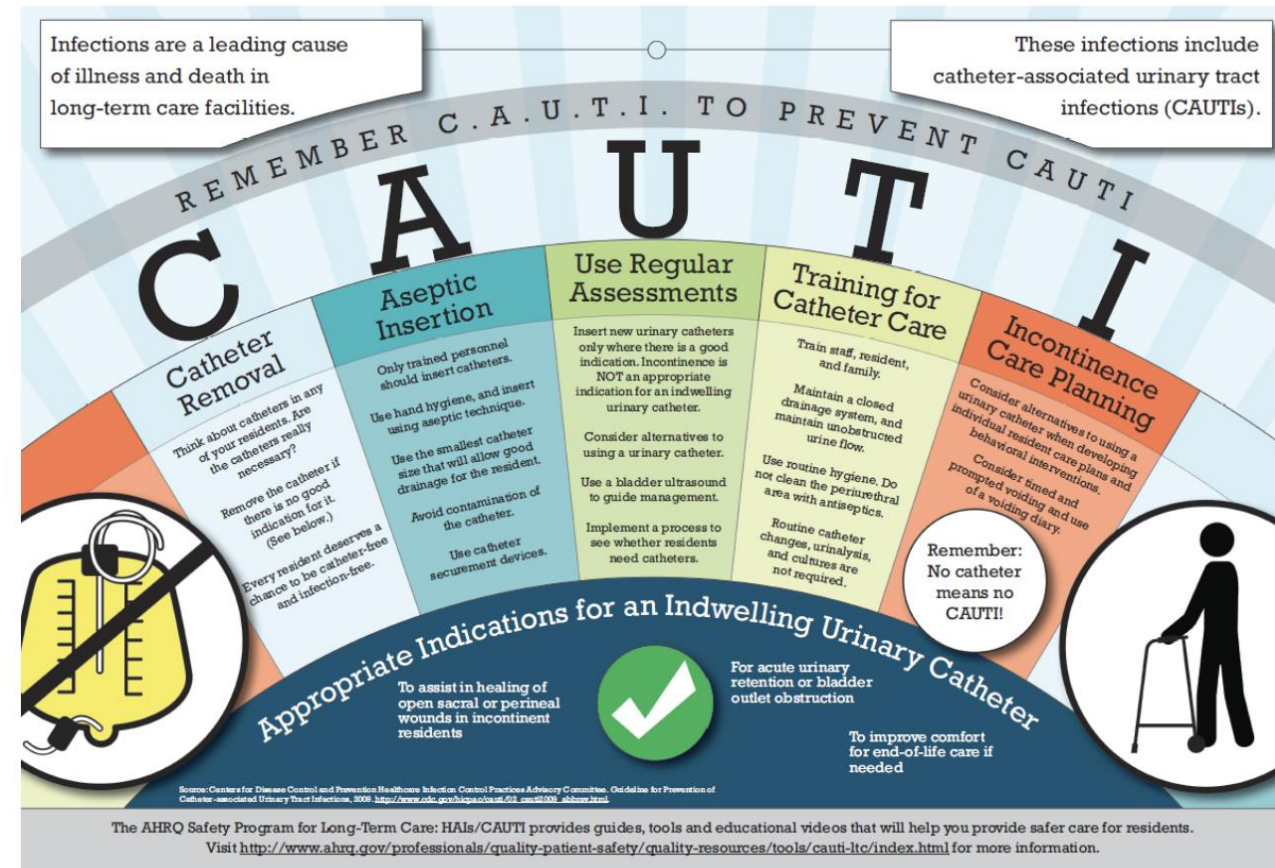
Download SBAR:

asap.nebraskamed.com/wp-content/uploads/sites/3/2019/01/SBAR-communication-tool-template-for-suspected-urinary-tract-infection.docx

☐ Other: _____
☐ For antibiotic orders (if needed) please complete script below:
 Drug: _____ Dose: _____ Route: _____ Frequency: _____ Duration: _____ Indication: _____

Reduce Catheter Use

- Nurse driven algorithms
- Automatic catheter stop orders
- Identify CAUTI champions
- CAUTI champions to improve staff education & implement prevention
- **“Technical bundle”**: cath removal, aseptic insertion, regular assessments, training for cath care, incontinence care planning, and hydration practices in NH residents: 54% reduction in CAUTI, 15% decrease in urine culture orders



UTI Program Development

- Assessment: practice change questionnaires, readiness considerations
- Plan: barriers to change, action plan, buy-in, support considerations
- Implementation
- Resources, tools

Download Program Toolkit

publichealthontario.ca/-/media/Documents/U/2019/uti-implementation-guide.pdf?rev=f935c436e3d74a0095be05c2e6c13fb7&sc_lang=en

UTI Program Details

publichealthontario.ca/en/Health-Topics/Antimicrobial-Stewardship/UTI-Program?tab=0

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Urinary Tract Infection (UTI) Program:
Implementation Guide, Second Edition
Reducing Antibiotic Harms in Long-Term Care



1st Revision: November 2019

Catheter Associated Urinary Tract Infection

Microbiology

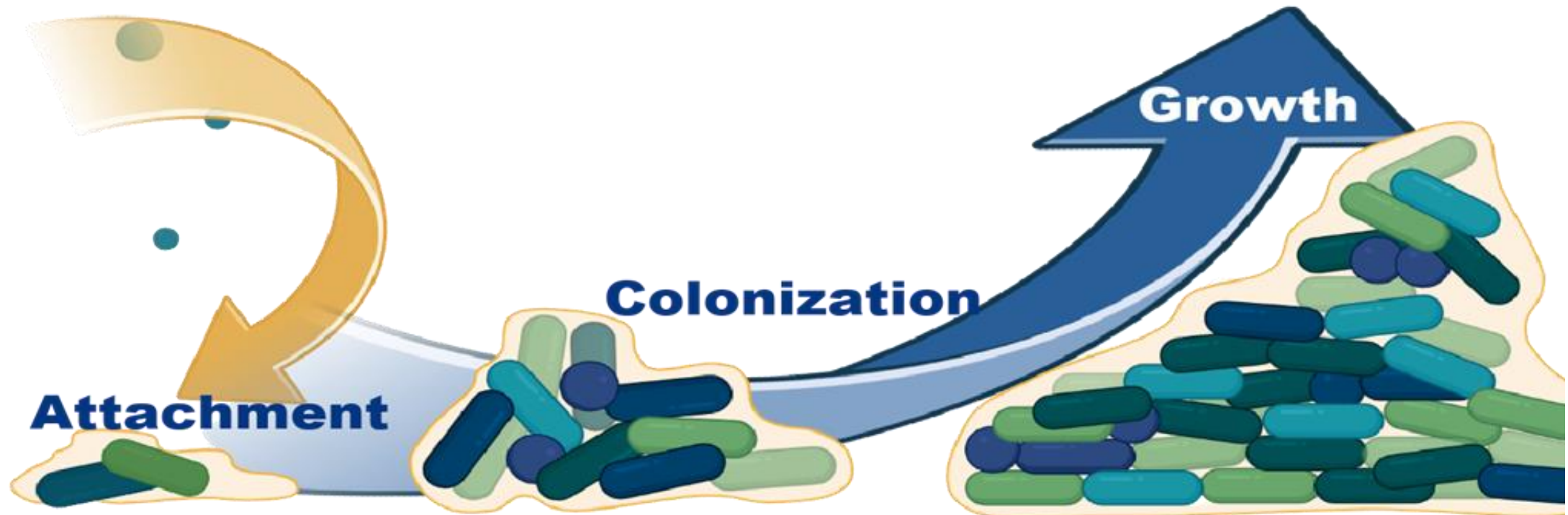
- *E.coli* (24%)
- *Candida* spp (24%)
- *Enterococcus* spp (14%)
- *Pseudomonas aeruginosa* (10%)
- *Klebsiella* spp (10%)

Some of the organisms commonly found with Catheter Associated (CA)-bacteriuria lack virulence factors which allow usual pathogens to adhere to uroepithelium, but take advantage of bladder access via the catheter (**Example: candida almost never causes infection in absence of catheter**)

Catheter Associated Urinary Tract Infection

Biofilm

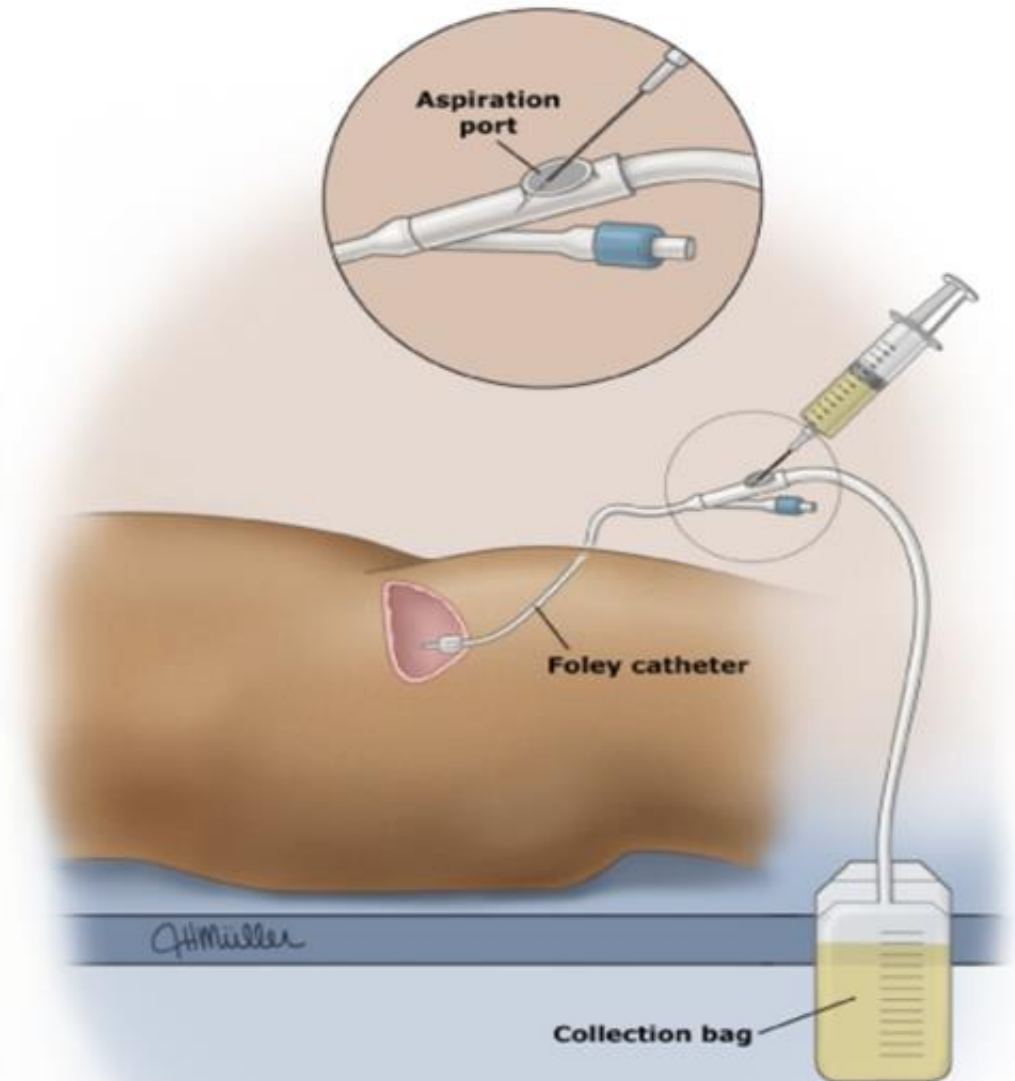
Adherent bacteria form **glycocalyx** (i.e., **slime layer**) coalesce forming biofilm → WBC unable to penetrate → pathogens deep w/in biofilm are metabolically inactive and able to become resistant to antibiotics (abx) quickly (as abx don't penetrate film)



Catheter Associated Urinary Tract Infection

Diagnosis

- **Ideally sample urine by removing catheter & obtaining mid-stream specimen**
- Many have needleless site which is cleaned prior to collection (if cath retained – less optimal option) b/c **when don't replace cath, the biofilm is frequently what is cultured** rather than bladder pathogens



	Isolates	Ampicillin	Amox/clav	Amp/sulb	Pip/tazo	Cephalexin	Ceftriaxone	Cefepime	Aztreonam	Ciprofloxacin	Levofloxacin	Nitrofurantoin	TMP/s
A.baumanii	176			94				79		89	81		84
E. cloacae	1534				83			94	86	94	95		92
E.coli	31,872	56	85	63	97	86	94	95	96	81	82	96	77
K.aerogenes	576				85		86	97	89	98	98	22	98
K.oxytoca	792		94	63	91		95	97	95			87	
K.pneumoniae	5942		95	86	96		96	97	97	96	97	48	92
P.mirabilis	3385		96	85	98		97	97		67	70		74
P.aeruginosa	5017				91			91		86	80		
Group B strep	598	100					99				100		
E.faecalis	4644	99								81	83	99	
E.faecium	676	25								18	25	31	
VRE.faecium	83	4										50	

Management

Guidelines			
Condition	Preferred	Alternative	
Uncomplicated UTI	Nitrofurantoin x 5 days	Bactrim x 3 days	Cephalexin x 3-7 days Cefpodoxime Cefuroxime Cefdinir
		Alt to above:	Levofloxacin x 3 days
Complicated UTI	Nitrofurantoin x 7 days	Bactrim x 7 days	Cephalexin x 7 days Cefpodoxime Cefuroxime Cefdinir
		Alt to above:	Levofloxacin x 7 days
Pyelonephritis	Cipro or Levoflox x 7 days	Bactrim x 7-14 days	Augmentin x 10-14 days

Sources: Gupta K, et al. CID; 2011;52(5):e103-e120; Nicolle L, et al. CID 2019;68(10):e83-75; Tamma P et al. CID 2021;72(7):e169-e183

Management

Guidelines			
MDRO	Preferred	Alternative	
VRE	Amoxicillin 500 - 1000 mg TID-BID urine drug exceeds MIC necessary for therapeutic effect	Daptomycin	Linezolid
ESBL	Fosfomycin 3g q72h x1-3 doses not for use for pyelonephritis	Ertapenem	

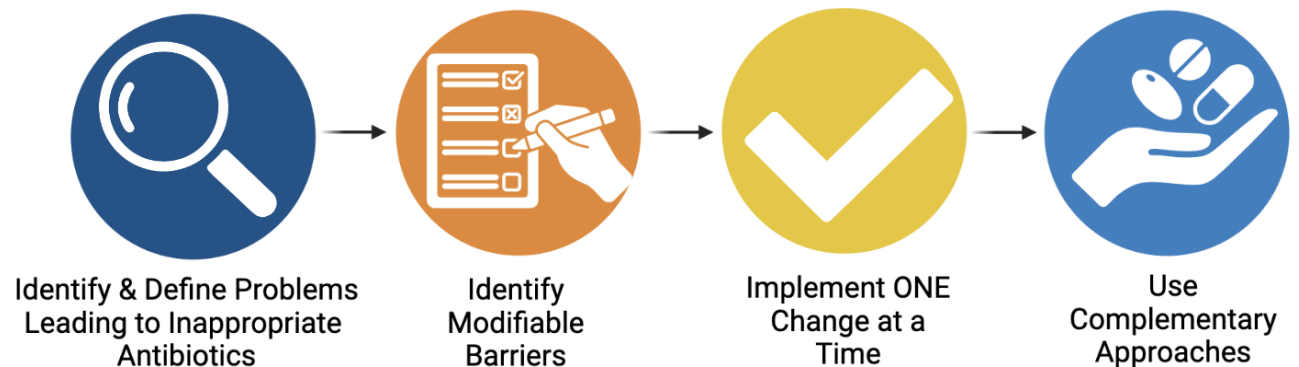
Sources: Cole K. et al. Antimicrob Agents & Chemother. 2015;59(12):7362-66; Shah K. et al Int J Antimicrob Agents 2018;51(1):57-61

Choosing Initiatives

Any intervention may be effective in isolation, a combination of interventions *targeting both systems + persons* is most effective

Designing successful intervention bundle involves six crucial steps:

1. Assess need and define underlying problem.
2. Identify which key barriers are modifiable, have greatest impact for change and would lead to most benefit.
3. Implement one change at a time.
4. Use complementary approaches.
5. Test intervention in pilot population.
6. Assess outcomes at regular intervals.

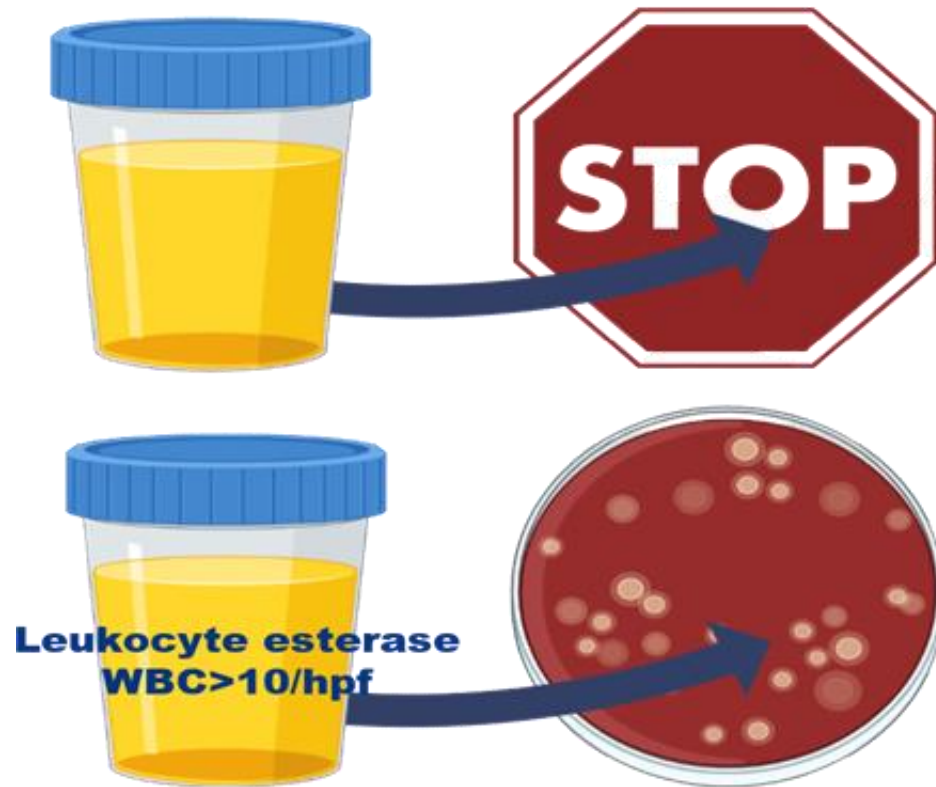


Urine Culture Stewardship

Pre-Analytic	Analytic	Post-Analytic
Ordering: Focus on testing only high pretesting probability Collecting: Sample collection and transport to optimize yield, reduce contamination	Culturing criteria: Only if pyuria (or leukocyte esterase) present	Reporting: resulted in format that guides appropriate practice
Testing: only dependent upon symptoms; avoid blanket or repeated UA/cultures (For Example: falls/confusion)		Micro-nudges/comments (For example: “multiple organisms reflecting contamination” “no pyuria, culture not performed”)
Technique: sampling from straight cath or replaced foley or collection port (not bag)		

Culture Stewardship

Reflex Urine Cultures

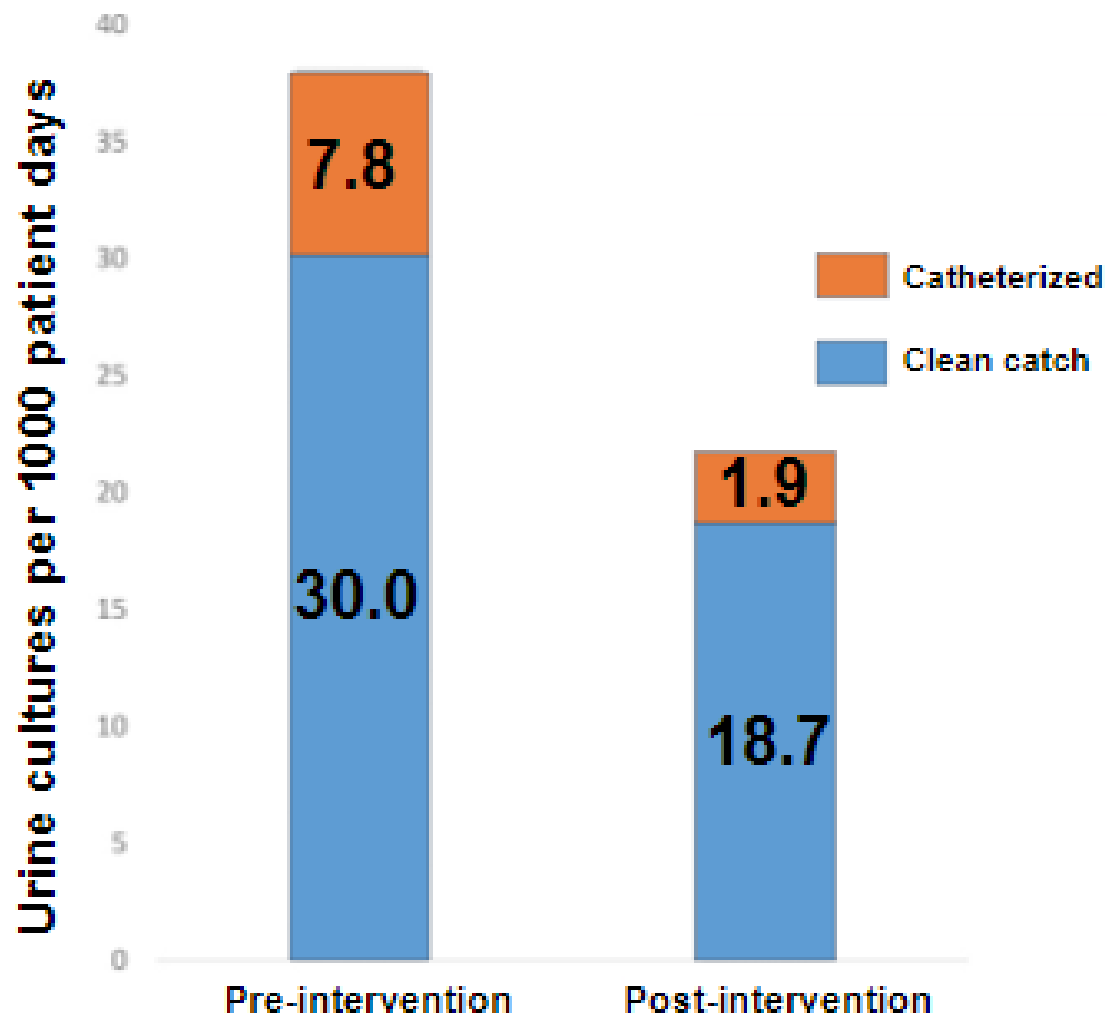


Outcomes

- **45.6%** (35.2->18.6 / 1000 pt-days)
- **45.2%** (3.58 ->1.82 /100 PD)
- **45.1%** (38.1->20.9/1000 PD)
- **40.4%** (1175->701/10,000 PD)

Culture Stewardship

Urine Culture Rate by Specimen Type



Outcomes

- **\$103,345 inpatient lab costs saved** (\$6490 avg monthly lab costs, \$236k→ \$132k, doesn't include delayed hospital discharges, abx costs)
- **45% urine cultures** (7.8→ 1.9 cath urine culture / 1000 PD, $p < 0.001$)
- **0% change CAUTI rates** (0.3 /1000 PD)

Culture Stewardship

Limitations

- Determining the threshold and is it arbitrary (For example: WBC>10)
- Do interventions reduce reflexive testing **and** reduce harm
- Caveats: certain populations non-applicable (For example: pre-urologic procedure)

Polling Question

Which of the following are examples of clinical decision support systems?

- A. Order set for CAUTI
- B. Best practice alert auto-triggering upon coding of UTI
- C. EMR auto pop-up of relevant UTI variables (For example: UA) into decision support pathway
- D. All of the above

Polling Question

Which of the following are examples of clinical decision support systems?

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- C. EMR auto pop-up of relevant UTI variables (For example: UA) into decision support pathway
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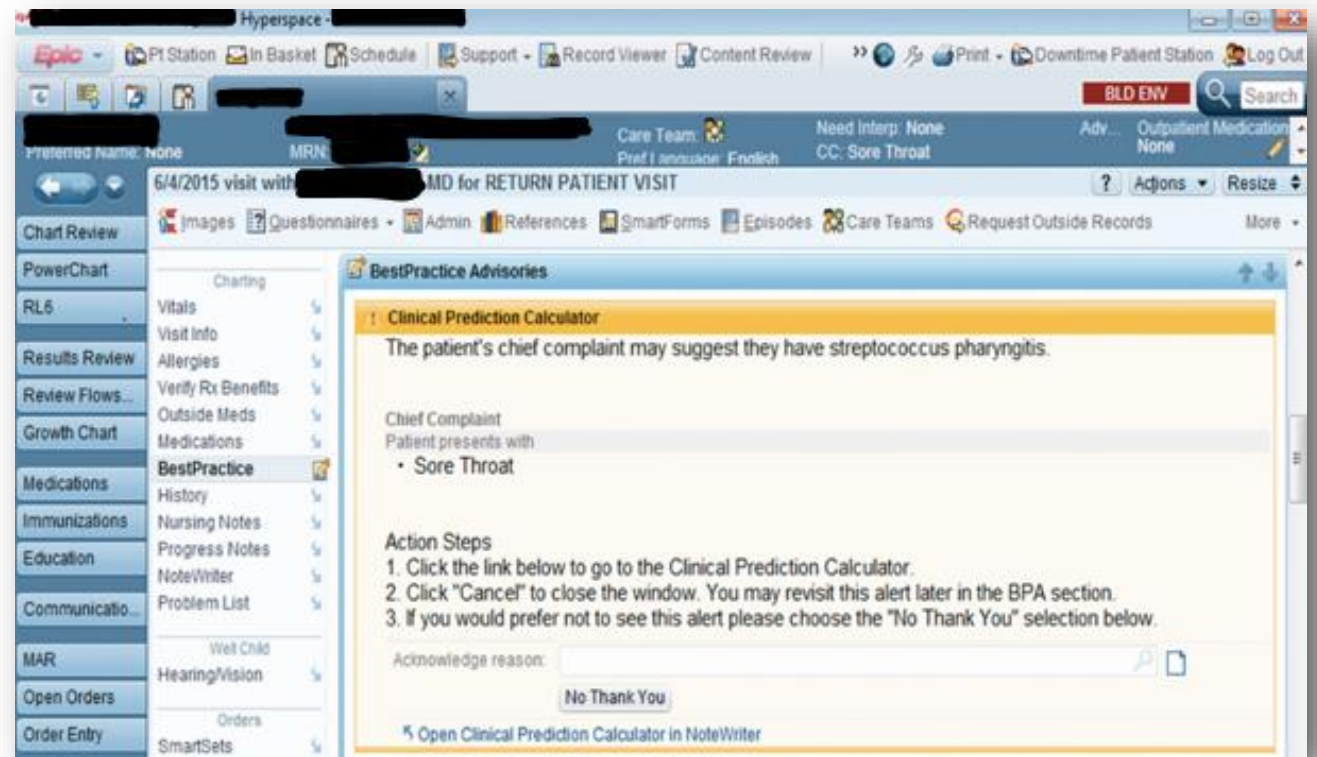
Clinical Decision Support System

Means of assisting in UTI treatment

GOAL: guide prescribers toward certain antibiotics

EMR treatment-support

- Best practice alert auto-triggered upon antibiotic-Rx for UTI
- Clinician enters diagnosis (UTI)
- Pop-up w/ relevant info extracted EMR
- Abx recommended based on guideline
- Clinician can opt-out



UTI Management

HPI:

Dx description/symptoms:

Cystitis:

- ☐ dysuria
- ☐ frequency
- ☐ urgency
- ☐ fever < 101
- ☐ + leukocytes or nitrites

Pyelonephritis:

- ☐ fever > 101
- ☐ chills
- ☐ nausea
- ☐ vomiting
- ☐ CVA tenderness
- ☐ flank pain
- ☐ + leukocytes or nitrites

Dx for this visit: ☒ Cystitis ☐ Pyelonephritis

Diagnostic/Laboratory Tests:

A1C: 7.0 (03/01/2017 4:50:24 PM)

Cr Creatinine

CRCL (GFR)

HCG

GC/Chlamydia

Orders

Add Cystitis Dx

UA

HCG

GC/Chlamydia**

UTI Treatment

Uncomplicated Cystitis

- Female
- Controlled Diabetes (A1C < 7)
- No chronic immunosuppression
- No concurrent STD
- No GU abnormality
- < 3 UTIs in past year
- No active malignancy
- No pregnancy
- No use of prophylactic antibiotics
- No indwelling catheter

Complicated Cystitis

- Male
- Active malignancy
- Concurrent STD
- Uncontrolled Diabetes (A1C > 7)
- GU abnormalities
- > 3 UTIs in past year
- Pregnancy
- Immunosuppressed
- Use of prophylactic antibiotics
- Indwelling catheter

Medications

FLONASE ALLERGY RELIEF 50 MCG/ACT NASAL SUSP (FLUTICASON PROPRIONATE) Take 1 puff each nostril every 8 hours as needed

ORTHO TRI-CYCLEN LO 0.18/0.215/0.25 MG-25 MCG ORAL TABS (NORGESTIM-ETH ESTRAD TRPHASIC) Take 1 pill by mouth daily

BUMEX 1 MG ORAL TABS (BUMETANIDE) 1 tab qd

Allergies

PENICILLIN (Critical)

CHEMOPLUS LATEX GLOVES (DISPOSABLE GLOVES) (Critical)

ADHESIVE TAPE (Severe)

Preferred Regimens

Add Nitrofurantoin 100 mg twice daily for 5 days ****See note**

****Avoid if CrCl < 30 mL/min**

Add Cefdinir 300 mg twice daily for 7 days ****See Note**

****CrCl < 30 change to Q24h**

Add Fosfomycin 3 gm single dose *****See note**

*****Fosfomycin Requires PA through TennCare*****

Patient unable to take above regimens - Click for options

History of Present Illness

PCP:

Ref Provider:

CC:

View Prior HPI

Check Box to Insert Form(s) or Template

☐ CHF Form

☐ COPD Form

☐ Depression-Anxiety Form

☐ Diabetes Mgmt Form

☐ New Procedure Form

☐ UTI Management Form

☐ Warfarin Management Form

Access tool from HPI form

View medication list from EHR

Click to document symptoms

Click to order pertinent tests

Explanation of diagnoses

View allergy list from EHR

Select from preferred regimens for diagnosis based on clinic-specific susceptibilities and guideline recommendations

Click to view other regimens

Clinical Decision Support System

Outcomes

Guideline-concordance Antibiotic

- **+ 50.2%** (31.7% -> 47.6% = 15.9, setting: ED)
- **+ 60.3** (53%-> 85%=32, p=0.005, setting: clinic)
- **4-fold** more likely to adhere to guideline-recs with use of tool

Fluoroquinolone Use

- **- 64.3%** (42%->15% = -27% absolute, p<0.001, setting: outpt, 29% tool use)

Bactrim Use

- **- 74%** (27% -> 7% = 20% absolute, p=0.003)

Nitrofurantoin Use

- **+ 41.9%** (76%->45% = 31% absolute, p=0.01)

Clinical Decision Support System

Outcomes

CAUTI Rates

- - **9.9%** (1.82-> 1.64/1000 cath-days)
- - **19.1%** (11.5->9.3/10k cath-days)
- **0%** (0.3->0.3/1000 pt-days)

Antibiotic Rx Per Normal UA

- - **10.8%** (48.7% -> 43.4% = -5.3%,
p<0.001)
- - **13.6** (35.9% -> 31% = -4.9%, no p value)
- - **80.0%** (45.1% -> 9% = -36.1%, p<0.01)

Antibiotic DOT

- - **5.3** (449-> 425 /1000 PD, no p value)
- - **15.2** (102.5->86.9/1000 PD, p=0.01)

Micro Nudges

Endorsed by IDSA/SHEA and CLSI

- **Goal: guide prescribers towards certain antibiotics**
- Selective or cascading reporting are most common
- Work with lab and interdisciplinary development (lab, end-users)

Three forms:

1. **Present desirable** options, and **mask undesirable** options
2. Frame recommendations with **comments to guide decisions**
3. **Visually enhance desired** options

Reporting Nudges

Leverage the laboratory to improve antibiotic use

- **Result** text interpretation
- “multiple organisms present indicating likely contamination”
- “no pyuria, culture not performed”

Reporting Nudges

Candiduria Nudging

“In absence of symptoms, Candida is generally considered normal flora. No therapy indicated unless high risk (pregnant, neonate or neutropenic) or undergoing urologic procedure. If Foley catheter present, remove or replace when able”

Candida urine cultures

Antifungal treatment pre- and post templated comment to candida urine culture results

Antibiotic Outcomes

- - **14% antifungals** (48%→34% w/in 72h candida-result, p=.02)

Clinical Outcomes

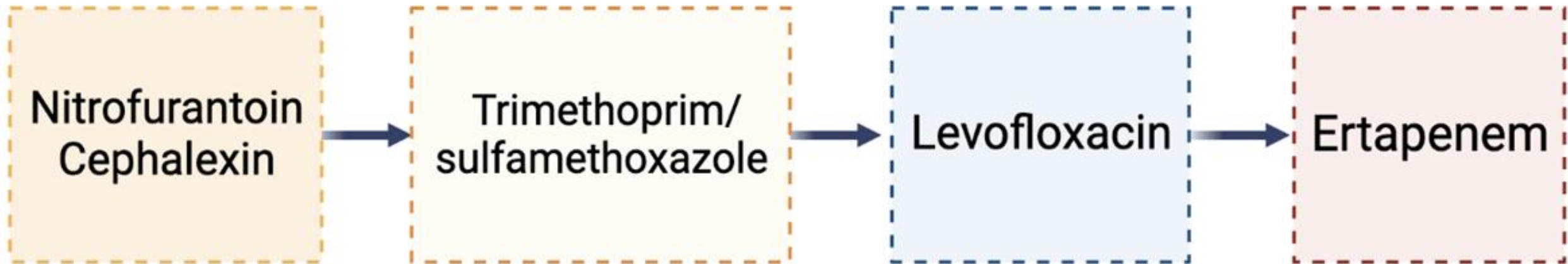
- **No change in 28-day candidemia**

Reporting Nudges

Leverage the laboratory to improve antibiotic use

Selective reporting of antibiotic susceptibilities

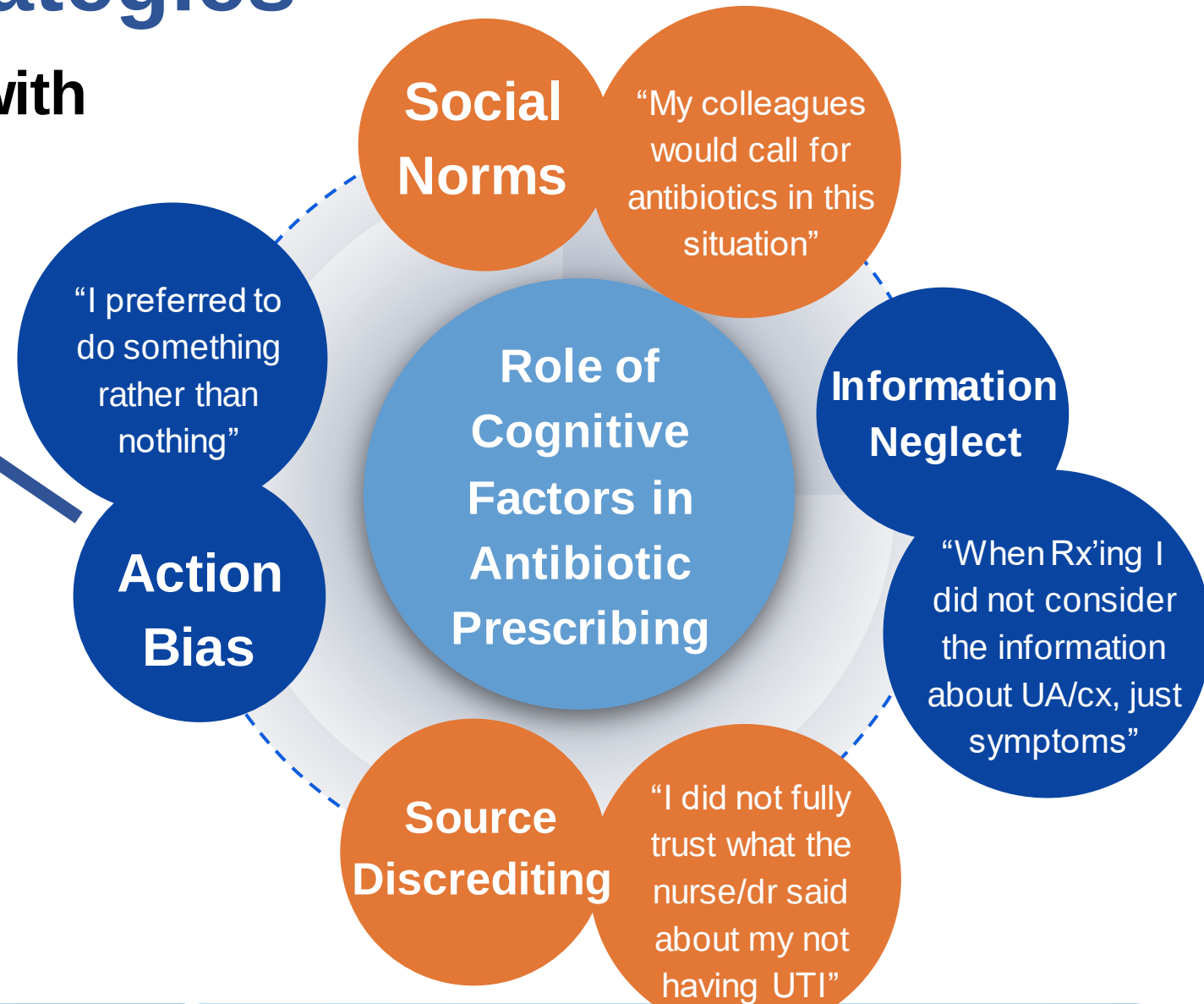
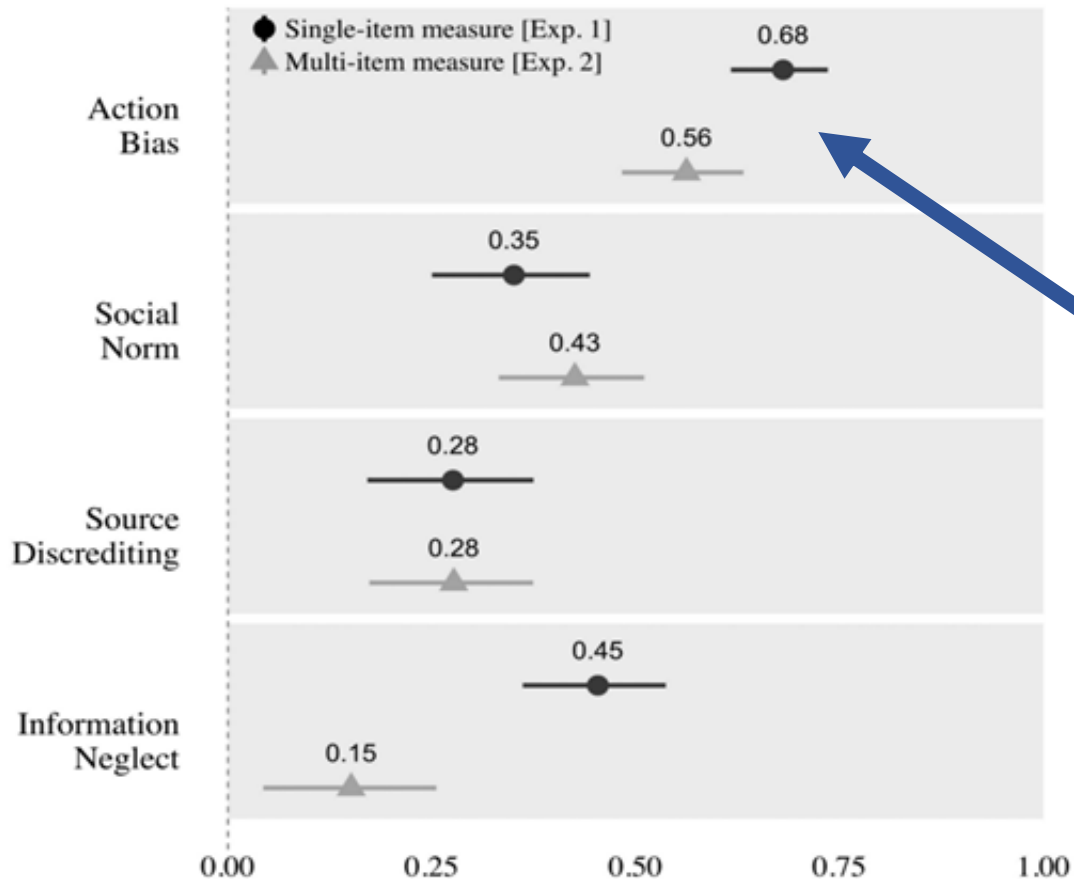
For Example: *E. coli* report nitrofurantoin, cephalixin, hide levofloxacin



Out of sight, out of mind

Communication Strategies

Correlation for cognitive bias with the decision to take antibiotics



Communication Strategies

Reframe the Inaction Message - Prescriber

- “Watch and wait”
- “Wait for cultures”
- “Cultures are negative there is nothing more to do”
- “UA had bacteria but given no symptoms, no need for treatment”
- “Start pain relief (For Exa,;e. Azo, pyridium, Tylenol) and increase hydration”
- “Good news! UA is negative, lets address the factors that might have caused the frequency (caffeine)”
- “UA had bacteria which is common, but given you have no symptoms, let me know if develop symptoms of UTI (pain, urgency, frequency)”

Communication Strategies

Reframe the Inaction Message - Nurse

- “Likely not UTI, call back if symptoms change”
- “No need for UA given no symptoms”
- “Given symptoms inconsistent with UTI, I’m not calling the Doctor”
- “Likely the smelly urine is from foods you ate, stop that food and let us know if develop burning, urgency, pain”
- “Given symptoms inconsistent with UTI, I’m documenting smelly urine with lack of pain, urgency, frequency, fevers and no UA obtained”

Communication Strategies

Reframe the Inaction Message - Pharmacist

- “7 days is too long, but better safe than sorry”
- “Levofloxacin has an interaction with the patient’s other meds, but the ordering provider is aware”
- “7 days is a longer than the 3-day course our guidelines recommend, and we’ve been having problems with *C.diff*, do you mind if I change it to 3 or 5 days?”
- “Levofloxacin interacts with their cardiac meds, an alternative based on our facility guidelines is nitrofurantoin which this *E.coli* is covered by”

Communication Strategies

Rx Name: _____

DIAGNOSIS

- ☐ Asymptomatic bacteriuria (bacteria in urine without infection)
- ☐ Dysuria (painful urination without infection)
- ☐ Dyspareunia (painful sex)
- ☐ Interstitial cystitis (bladder wall inflammation)
- ☐ Pelvic floor dysfunction (pelvic muscle pain)
- ☐ Vaginitis (vaginal irritation)

The symptoms and/or urinalysis you presented with today do NOT suggest an infection.

Antibiotics were not started because they are ineffective for dysuria without infection and asymptomatic bacteriuria, may cause side effects, harm & may lead to resistant bacteria limiting future antibiotic options.

Please return or call if symptoms do not improve in ____ day(s), develop fevers or chills, lower abdominal or back pain, blood in the urine, or other new or concerning symptoms.



SYMPTOM RELIEF MEDICATIONS

Always use medications according to package instructions

- | | |
|--|---|
| ☐ Acetaminophen 325-650 mg every 4-6 hours as needed | Pain, burning |
| ☐ Phenazopyridine 100-200 mg three times daily as needed
<i>(orange urine discoloration expected; limit 3 days continuously)</i> | Pain, burning |
| ☐ Methenamine Hippurate 162 mg + sodium salicylate 162 mg daily,
2 tablets three times daily as needed | Burning +/- prevent infection |
| ☐ Estrogen topically, 2 to 5 times weekly* | Vaginal irritation, healthy vaginal flora |

PREVENTIVE MEDICATIONS

- | | |
|--|---|
| ☐ Methenamine Hippurate 1000 mg twice daily* (take with vitamin C 1000 mg to activate; don't take same time as sulfa meds, <i>strong urine smell expected</i>) | Prevent bladder bacterial growth |
| ☐ Cranberry supplement or 10-30 oz cranberry juice daily | Prevent <i>E.coli</i> bladder wall attachment |
| ☐ D-mannose 2 gram daily | Prevent bacterial bladder wall attachment |
| ☐ Probiotic, lactobacillus at least 10 billion cfu daily | Protect from (harmful) bacterial overgrowth |

** Rx required*

DIET / HYGIENE

- | | |
|---|--|
| ☐ Avoid caffeine, alcohol, artificial sweeteners, spicy foods | ☐ Avoid irritants (spermicide, diaphragms, feminine hygiene sprays, powders, douches) |
| ☐ Consider diet for interstitial cystitis (ichelp.org) | ☐ Urinate after sex, wear cotton undergarments |
| | ☐ Avoid constipation and diarrhea |
| | ☐ Empty bladder at regular intervals |

Prescriber: _____ Date: _____

Tracking & Reporting Interactive HAI Spreadsheets

Catheter-associated Urinary Tract Infection (CAUTI) Control Chart

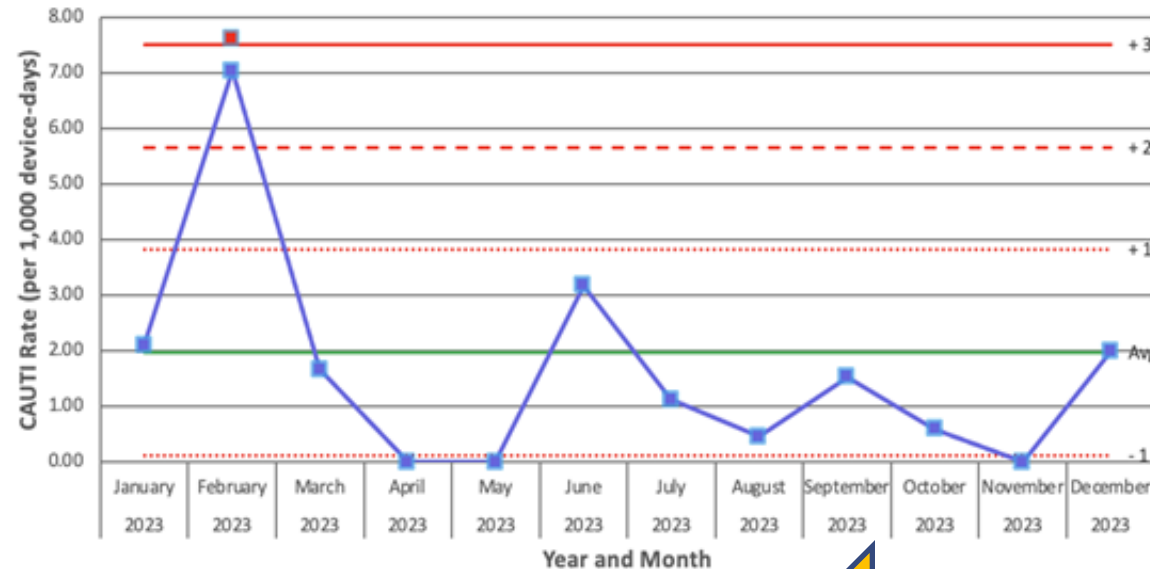
Instructions

- For current standardized surveillance definitions for this measure, see the CDC's NHSN protocol: [Device Associated UTI Module Protocol](#)
- Collect the count of infections (numerators) and the count of device days (denominators), by month, for a one year period on the same unit. Do not combine units.
- Select the month you want to begin with:
- Enter year of the month you want to begin with:
- Enter the count of infections and patient days to the corresponding month. Only edit the purple cells.

Year	Month	Infections	Device Days	Rate
2023	January	4	1908	2.10
2023	February	12	1707	7.03
2023	March	3	1809	1.66
2023	April	0	1843	0.00
2023	May	0	1627	0.00
2023	June	6	1893	3.17
2023	July	2	1789	1.12
2023	August	1	2201	0.45
2023	September	3	1965	1.53
2023	October	1	1684	0.59
2023	November	0	1628	0.00
2023	December	4	2013	1.99

- The multiplier is pre-defined as per 1,000 device days.

Control Chart of Catheter-associated Urinary Tract Infection (CAUTI) Rate per 1,000 Patient-days, by Month.



- Average
- One sigma limit
- Two sigma limit
- Three sigma limit
- A single point outside the control limits
- Two of three points outside the control limits
- Four of five points outside the control limits
- Eight points in a row on the same side of the average

- UTIs
- Urinary cath use
- CAUTIs
- *C. diff*

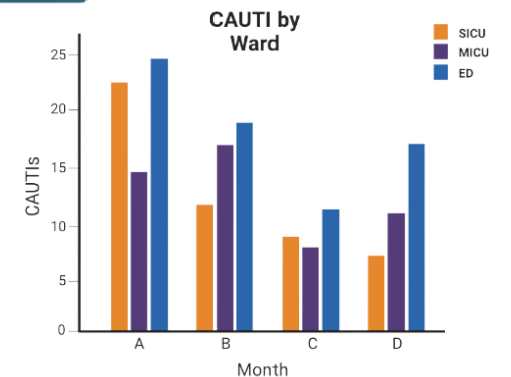
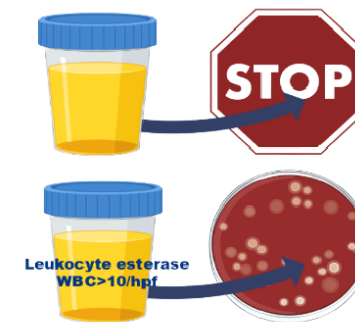
Download Tracking Spreadsheet

kdhe.ks.gov/DocumentCenter/View/14446/

Tracking & Reporting

Share results with staff to ensure aware of how they're doing (and practice reminders)

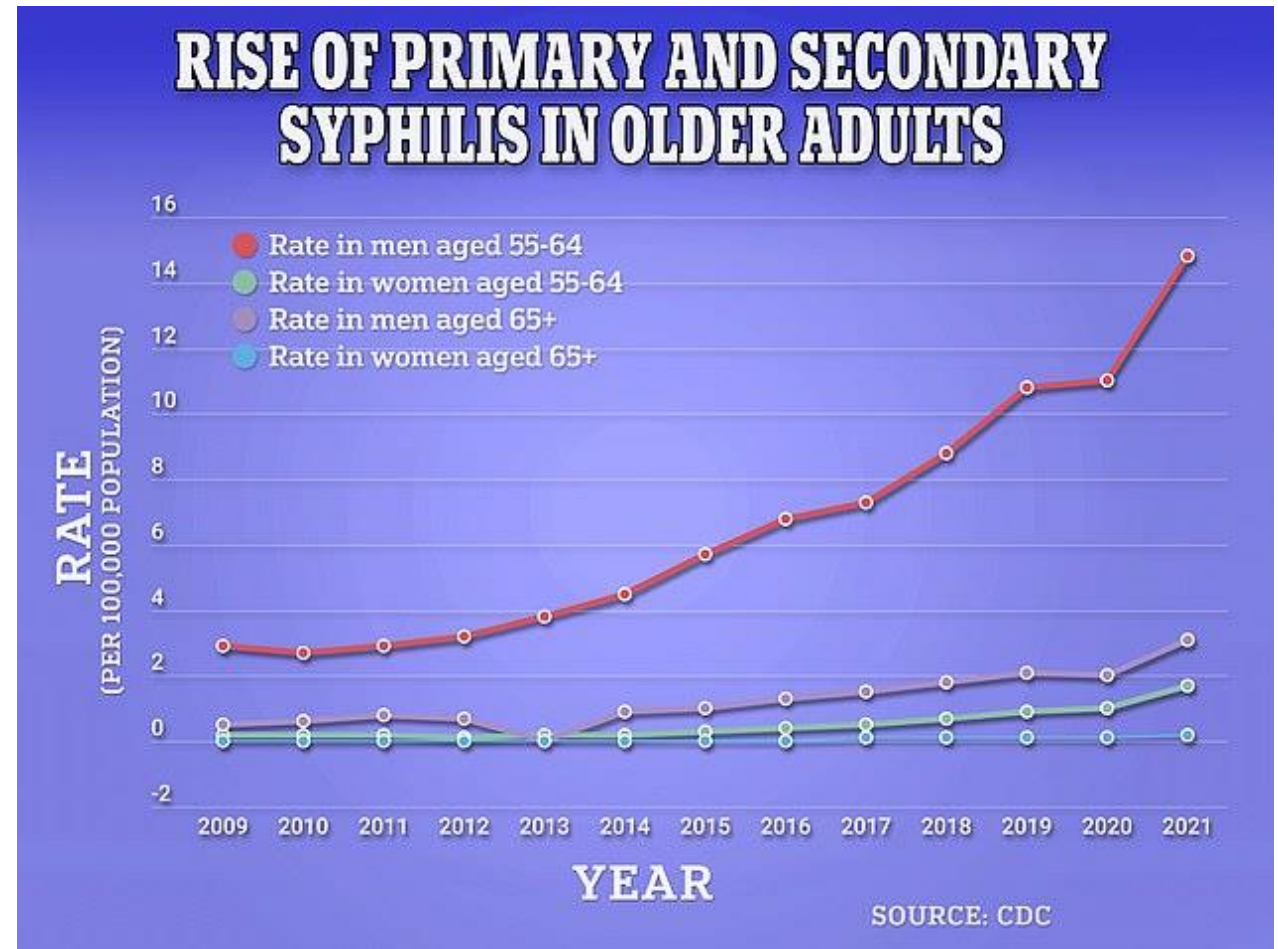
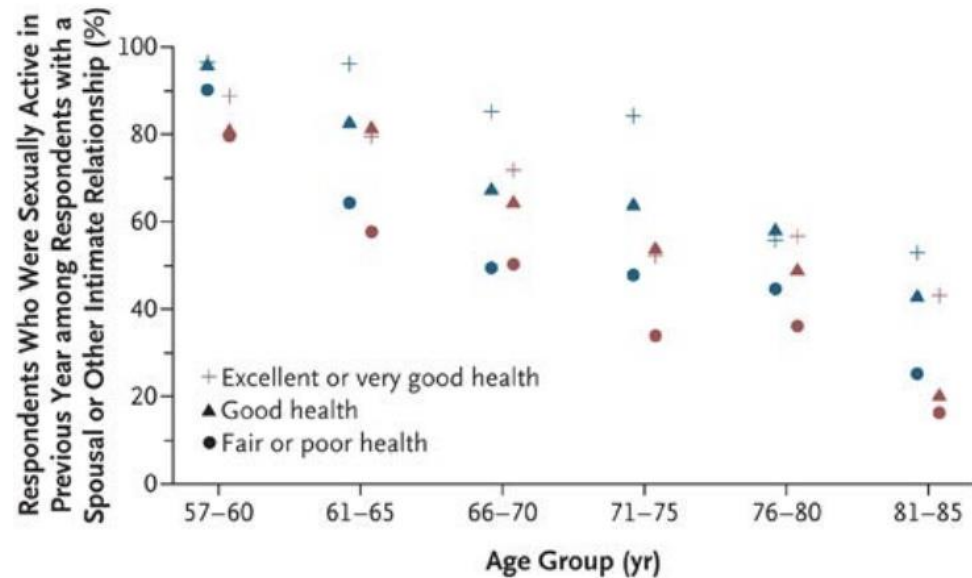
- Email
- Staff meetings
- Huddles
- 1:1 feedback
- 1-paged reports, posters, memos
- IPAC, Quality, P&T meetings



Sexually Transmitted Infections

Sexually Active by Age Group

- 73% aged 57-64
- 53% aged 65-74
- 26% aged 75-85



Polling Question

Which of the following age groups accounted for the most cases of early syphilis in Kansas in 2020?

- A. 15-19
- B. 20-24
- C. 25-29
- D. 30-34
- E. 35-39
- F. > 40

Polling Question

Which of the following age groups accounted for the most cases of early syphilis in Kansas in 2020?

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B. 20-24

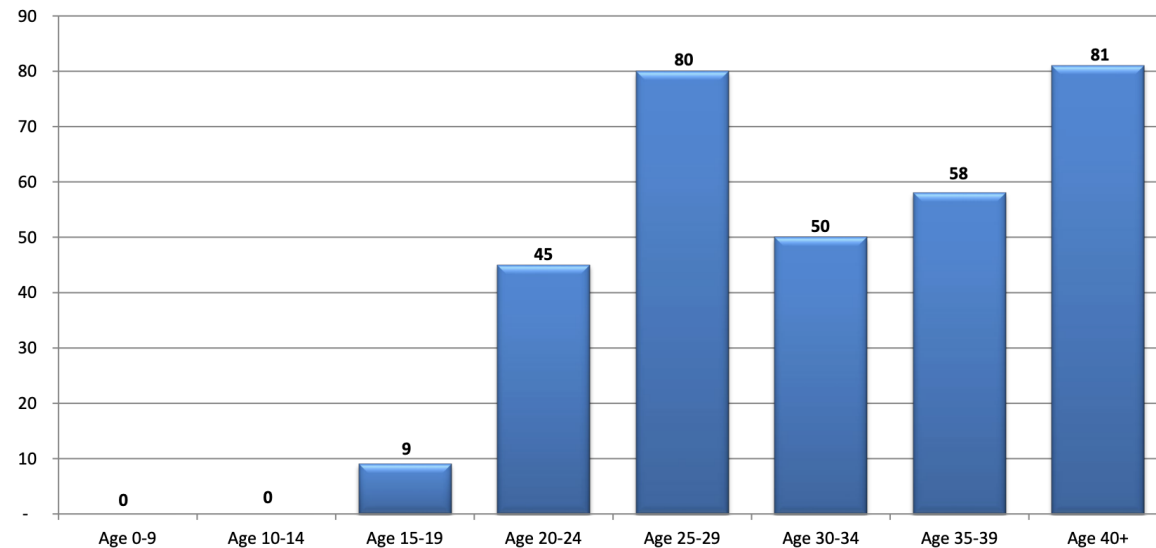
C. 25-29

D. 30-34

E. 35-39

F. **> 40**

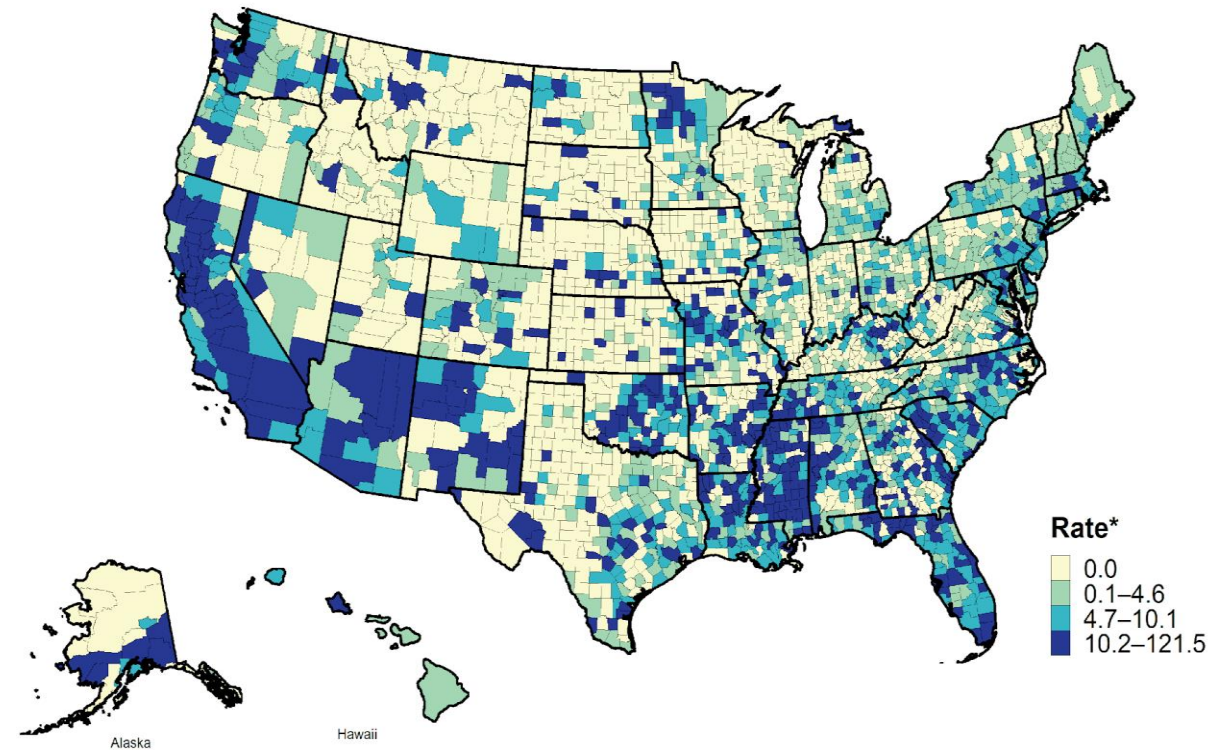
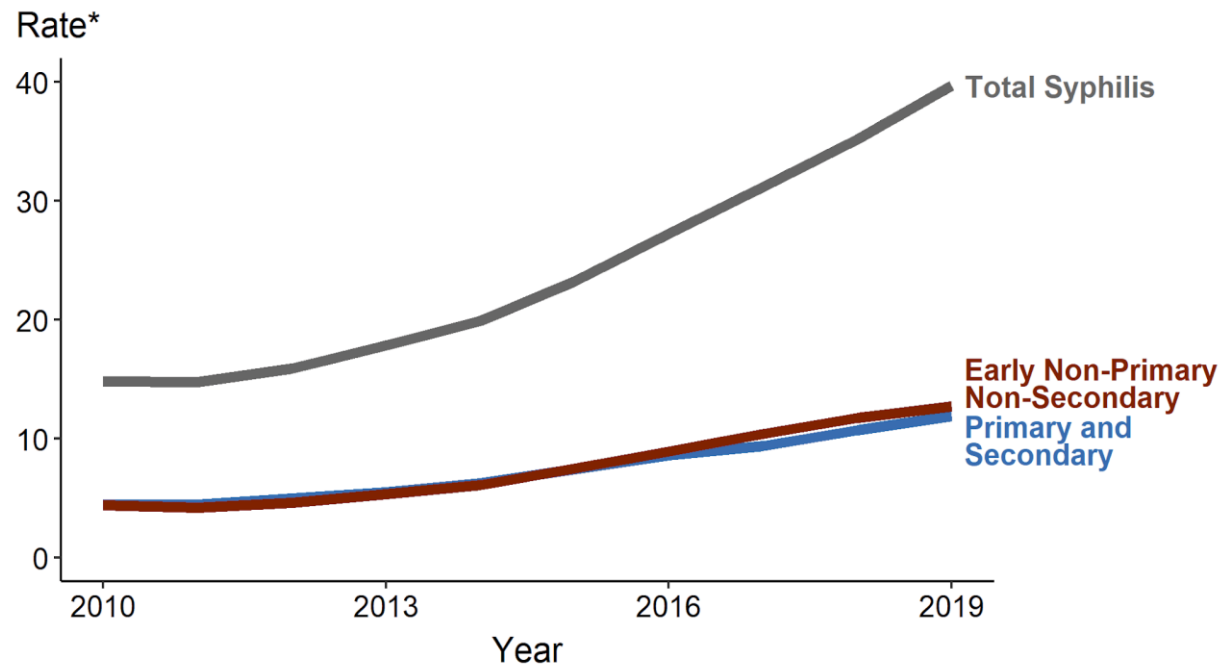
State of Kansas
Reported Cases of Early Syphilis by Age
January - December 2020



Total: 323

Syphilis

Rates of Reported Cases by Stage of Infection, and County United States, 2010–2019



Syphilis

Primary

- Chancre (painless ulcer)
- Lymphadenopathy
- Incubates 3 weeks
- Resolves 3-6 weeks



Secondary

- Rash (palm, soles, anywhere) macules, papules, pustules
- Mucosal lesions
- Alopecia



Tertiary

- Neurologic (hearing, vision loss), headaches, dementia
- Cardiac (aortic aneurysms, arteritis)

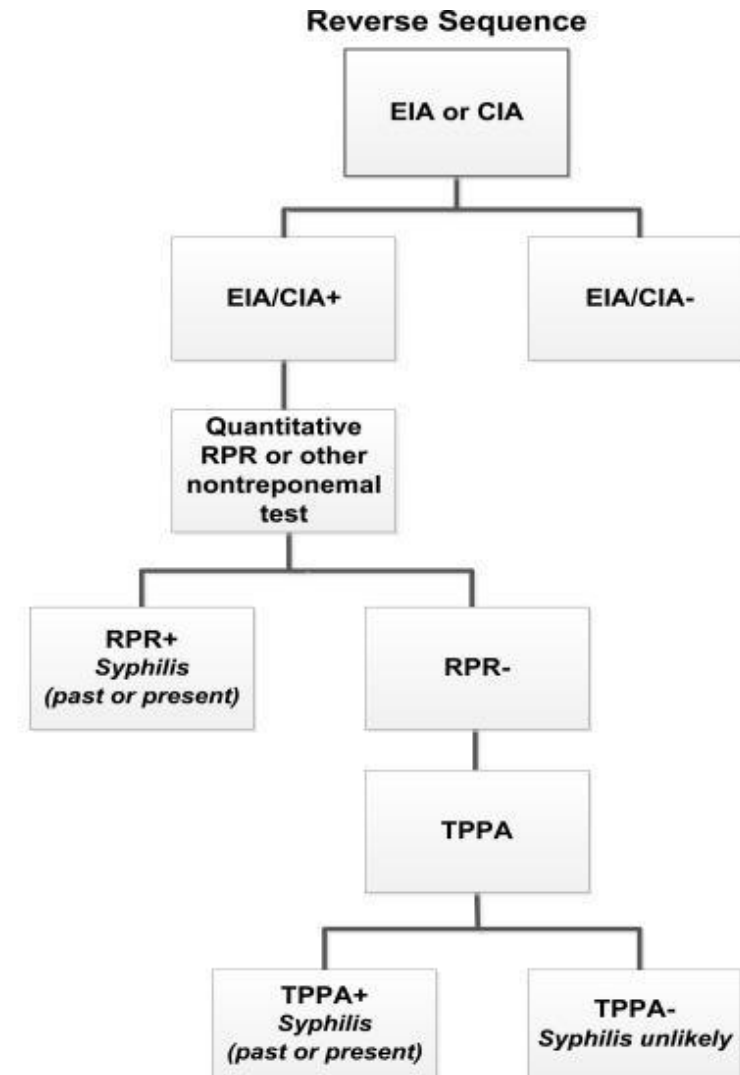
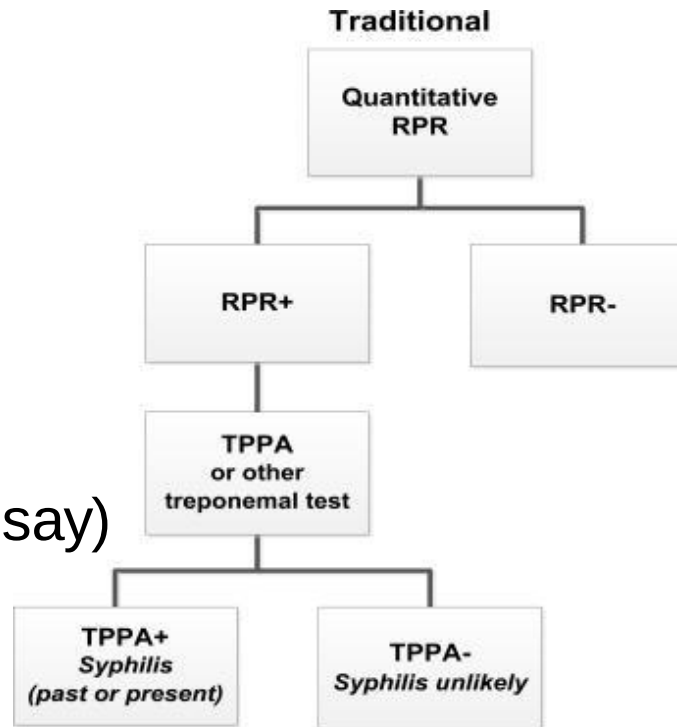
Syphilis

Diagnosis

- Non-treponemal: RPR
- Treponemal: syphilis antibody (*T.pallidum* enzyme immunoassay)

Treatment

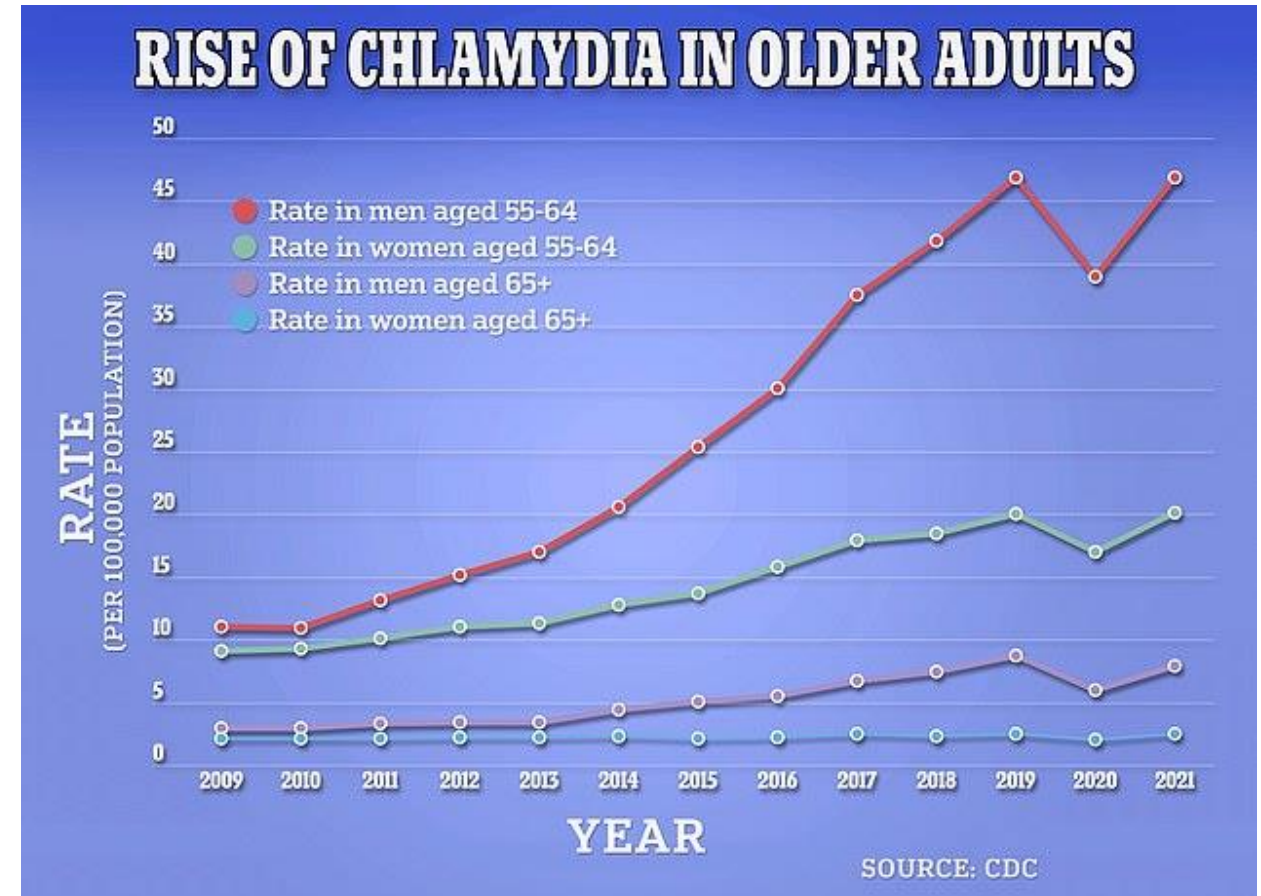
- Primary and secondary: aqueous penicillin G (IM or IV) x 1
- Latent and tertiary: PCN G weekly x3



Chlamydia

Symptoms

- Women: dysuria, pyuria, pelvic pain
- Men: 40-96% are asymptomatic, may have mucopurulent or watery discharge, dysuria, staining underpants in the am, pain with ejaculation
- Either: pharyngitis, proctitis
- Most common bacterial STI



Chlamydia

Diagnosis

- PCR: urine, throat, rectum

Treatment

- Doxycycline 100 mg BID x 7 days
- Proctitis: 7-21 days
- Epididymitis: 10 days

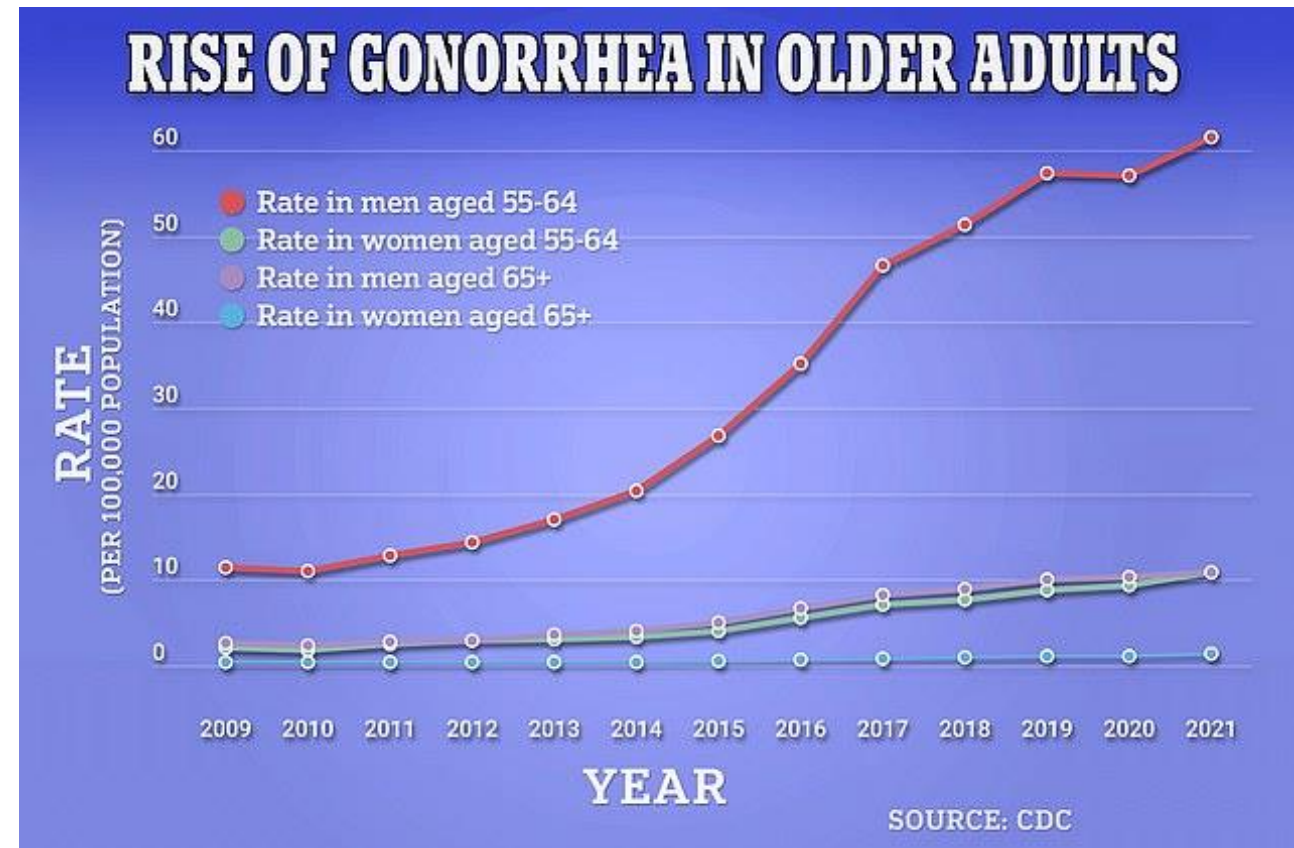


Image Source: [dailymail.co.uk/health/article-11969897/Frisky-seniors-Experts-warn-STI-epidemic-RETIREMENT-HOMES.html](https://www.dailymail.co.uk/health/article-11969897/Frisky-seniors-Experts-warn-STI-epidemic-RETIREMENT-HOMES.html)

Gonorrhea

Symptoms

- Like chlamydia (burning, pelvic pain, discharge)
- Conjunctivitis
- Pharyngitis
- Less common than chlamydia



Gonorrhea

Diagnosis

- PCR of urine, rectum, throat, urethra

Treatment

- Ceftriaxone 500 mg IM x 1



Image source: <https://phil.cdc.gov/Details.aspx?pid=17492>

Taking a Sexual History

The 5 P's

- Partners: sexually active, last activity, gender(s)
- Practices
- Protection: testing, condoms
- Past STI
- Pregnancy

Taking a Sexual History

Take Aurally Available on iTunes & Soundcloud

Avoid assumptions!
No labels
Be clear with language
Who they had sex with
Type of sex
When they had it

Key points:

- Signpost early about reason for discussion and what will you need to know
- Consider need for emergency contraception or post-exposure prophylaxis
- Ask blood borne virus risk factors
- Practice your poker face Confidential environment

From the episode and blog www.takeaurally.com

#TakeVisually
@TakeAurally
@NUHDREAM
@QMCEDFOAM

Thank You!

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Quality Improvement and Infection Control
Consultant