

UC Davis Health Antimicrobial Stewardship Program

Volume 3, Issue 1
January 2021

The UC Davis Antimicrobial Stewardship Program (ASP) was first established in 1986 and then expanded in pediatrics in 2011 and hospital wide in 2013 in response to the growing challenge of antibiotic resistance. Due to increasing antibiotic resistance, patients are at a higher risk for adverse effects and poor outcomes and treatment strategies become more complex.

Antibiotics are life-saving drugs and their use has important implications for patient care and public health. With this in mind, the UC Davis Health ASP strives to ensure all patients receive optimal antibiotic therapy when indicated. We thank you for your support in putting this very important program into action.

*Image: Agar art submitted by Balaram Khamari to the 2020 ASM contest.
<https://asm.org/Press-Releases/2020/December/Amidst-Global-Pandemic,-Agar-Art-Contest-Proves-Mi>*

In This Issue

- UTIs: What You Need to Know
- Stewardship in the Time of COVID-19
- Test Your Knowledge
- ASP Gold Star Winners
- Meet the Stewardship Team

Urinary Tract Infections (UTI)

Diagnosis

- **First, ask about SYMPTOMS**

- Acute cystitis: dysuria, frequency, urgency, suprapubic pain
- Pyelonephritis: fever, flank pain
- Catheter-associated UTI (CAUTI): main symptoms are suprapubic pain and fever; patients with catheters may not report dysuria, frequency, or urgency

- If a person has symptoms, obtain a urinalysis (UA) and culture

- A positive UA shows evidence of inflammation (e.g., elevated white blood cells)
- A positive urine culture is defined as $\geq 10,000$ - $100,000$ CFU/mL of a urinary pathogen ($\geq 1,000$ in patients with urinary catheters)
- A positive culture in the absence of symptoms does not benefit from treatment in most cases

- If a chronic indwelling catheter is in place, remove and replace it before sending UA and culture

Treatment

Assess prior urine culture data, as previous susceptibility patterns can help guide antibiotic choice.

- **Uncomplicated acute cystitis** (cystitis in a female without urologic abnormality or catheter):

- Oral therapy preferred; avoid fluoroquinolones
- Nitrofurantoin 100 mg PO BID (preferred)
- Cephalexin 500 mg PO TID
- TMP/SMX 1 DS tab PO BID
- Fosfomycin 3 g sachet x 1

- **Uncomplicated pyelonephritis in women**

- Fluoroquinolones and trimethoprim/sulfamethoxazole are preferred given excellent penetration into the kidney when the isolate is susceptible
- Levofloxacin 750 mg PO daily (preferred)
- TMP/SMX 1-2 DS tabs PO BID
- Ceftriaxone 1 g IV q24h or Cefepime 1 q IV q8h depending on whether nosocomial

- **Complicated UTI** (UTI occurring in the presence of urologic abnormality, pregnancy, or urinary catheter or UTI in men)

- UTI in men in the absence of obstructive pathology (e.g., renal stone, stricture, enlarged prostate) or urinary catheter is uncommon
- Remove and do not replace urinary catheters whenever possible
- Nitrofurantoin 100 mg PO BID
- Ceftriaxone 1 g IV q24h or Cefepime 1 q IV q8h depending on whether nosocomial
- TMP/SMX 1 DS tab PO BID

Duration

Uncomplicated acute cystitis	Nitrofurantoin or cephalosporin: 5 days TMP/SMX: 3 days Fosfomycin: 1 day
Uncomplicated pyelonephritis	TMP/SMX: 7-10 days Fluoroquinolone: 5-7 days IV and Oral cephalosporins: 10-14 days (shorter course if early response)
Complicated UTI (including CAUTI)	Nitrofurantoin or cephalosporin: 10-14 days (7 days if entire course IV) TMP/SMX: 7 days Fluoroquinolone: 5-7 days

References

1. Boscia JA, Kobasa WD, Abrutyn E, et al. Lack of association between bacteriuria and symptoms in the elderly. *Am J Med.* 1986 Dec;81(6):979-82. PMID: 3799658.
2. Boscia JA, Kobasa WD, Knight RA, et al. Therapy vs no therapy for bacteriuria in elderly ambulatory nonhospitalized women. *JAMA.* 1987 Feb 27;257(8):1067-71. PMID: 3806896.
3. Cai T, Mazzoli S, Mondaini N, et al. The role of asymptomatic bacteriuria in young women with recurrent urinary tract infections: to treat or not to treat? *Clin Infect Dis.* 2012 Sep;55(6):771-7. PMID: 22677710.
4. Cai T, Nesi G, Mazzoli S, et al. Asymptomatic bacteriuria treatment is associated with a higher prevalence of antibiotic resistant strains in women with urinary tract infections. *Clin Infect Dis.* 2015 Dec 1;61(11):1655-61. PMID: 26270684.
5. Harding GK, Zhang GG, Nicolle LE, et al. Antimicrobial treatment in diabetic women with asymptomatic bacteriuria. *N Engl J Med.* 2002 Nov 14;347(20):1576-83. PMID: 12432044.
6. Lin K, Fajardo K, U.S. Preventive Services Task Force. Screening for asymptomatic bacteriuria in adults: evidence for the U.S. Preventive Services Task Force reaffirmation recommendation statement. *Ann Intern Med.* 2008 Jul 1;149(1):W20-4. PMID: 18591632.
7. McKenzie R, Stewart MT, Bellantoni MF, et al. Bacteriuria in individuals who become delirious. *Am J Med.* 2014 Apr;127(4):255-7. PMID: 24439075.
8. Nicolle LE. Asymptomatic bacteriuria in the elderly. *Infect Dis Clin North Am.* 1997 Sep;11(3):647-62. PMID: 9378928.
9. Nicolle LE, Bjornson J, Harding GK, et al. Bacteriuria in elderly institutionalized men. *N Engl J Med.* 1983 Dec 8;309(23):1420-5. PMID: 6633618.
10. Nicolle LE, Bradley S, Colgan R, et al. Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. *Clin Infect Dis.* 2005 Mar 1;40(5):643-54. PMID: 15714408.
11. Nicolle LE, Mayhew WJ, Bryan L. Prospective randomized comparison of therapy and no therapy for asymptomatic bacteriuria in institutionalized elderly women. *Am J Med.* 1987 Jul;83(1):27-33. PMID: 3300325.
12. Nicolle LE. SHEA Long-Term-Care-Committee. Urinary tract infections in long-term-care facilities. *Infect Control Hosp Epidemiol.* 2001 Mar;22(3):167-75. PMID: 11310697.
13. Nordenstam GR, Brandberg CA, Odén AS, et al. Bacteriuria and mortality in an elderly population. *N Engl J Med.* 1986 May 1;314(18):1152-6. PMID: 3960089.
14. Hooton TM, Bradley SF, Cardenas DD, et al. Diagnosis, prevention, and treatment of catheter associated urinary tract infection in adults: 2009 international clinical practice guidelines from the Infectious Diseases Society of America. *Clin Infect Dis.* 2010 Mar;50(5): 625-63. PMID: 20175247.
15. Saint S, Kaufman SR, Rogers MA, et al. Condom versus indwelling urinary catheters: a randomized trial. *J Am Geriatr Soc.* 2006 Jul;54(7):1055-61. PMID: 16866675.
16. Warren JW, Anthony WC, Hoopes JM, et al. Cephalexin for susceptible bacteriuria in afebrile, long-term catheterized patients. *JAMA.* 1982 Jul 23;248(4):454-8. PMID: 7045440.
17. Warren JW, Tenney JH, Hoopes JM, et al. A prospective microbiologic study of bacteriuria in patients with chronic indwelling urethral catheters. *J Infect Dis.* 1982 Dec;146(6):719-23. PMID: 6815281.

Stewardship in the Time of COVID-19

Co-infections up front?¹

- Not common
- Approximately 3%
 - Mix of community respiratory and bacterial pathogens

Co-infections later on?²

- Possible
- Approximately 10% overall
 - Mostly in higher acuity pts
 - Common HAI pathogens

Procalcitonin¹

- Typically negative in viral dz
- Can be positive in the setting of severe COVID-19
 - PPV only 9%, NPV 98%
- Positive tests not reliable to guide abx management

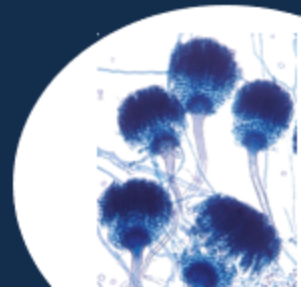
1. Vaughn V, Gandhi T, Petty L, et al. Clinical Infectious Diseases. ciaa1239.
2. Langford B, So M, Raybardhan S, et al. Clin Micro & Infect. 2020 Dec;26(12):1622-29.

What About CAPA?^{3,4}

(COVID-19 Associated Pulmonary Aspergillosis)

- Incidence unclear
 - Possible regional variation
- Mostly critically ill
 - Mostly delayed-onset
 - Primarily *A. fumigatus*
- ID consult for voriconazole

3. Bartoletti M, Pascale R, Cricca M, et al. Clin Infect Dis. 2020 Jul 28;ciaa1065.
4. van Arkel A, Rijpstra T, Belderbos H, et al. Am J Respir Crit Care Med. 2020 Jul 1;202(1):132-135.



Meet the Stewardship Team

Dr. Naomi Houser started as a faculty member in Infectious Diseases at UC Davis in August 2020 and works in both inpatient and outpatient settings and on the Infection Prevention team. She completed her ID fellowship in 2020 at the University of Maryland in Baltimore, MD, and internal medicine residency at Roger Williams Medical Center in Providence, RI. Her interests include infectious disease as it relates to climate change and other anthropogenic environmental changes, infection control and prevention, and zoonotic disease. Outside of work, she enjoys running, camping, and hiking with her dog.



If you see Dr. Houser, say hi to one of the new members of the team!

Test Your Knowledge

Would you like to win a \$10 gift certificate to the Sunshine Café? Complete the following post-newsletter quiz and submit to hs-ASP@ucdavis.edu to be entered into a raffle for a free lunch!

A 63-year-old female with Type II diabetes is seen in the ED following 24 hours of vomiting and dysuria. She is hemodynamically and afebrile. Exam is notable for some right-sided CVA tenderness, but she is otherwise non-toxic appearing. Her CBC is unremarkable, and she is discharged home.

1. What empiric antibiotic course is most appropriate for this patient?
 - a. Nitrofurantoin 100 mg PO BID x 10-14 days
 - b. Fosfomycin 3 g sachet PO x 1
 - c. Levofloxacin 750 mg PO daily x 5-7 days
2. True or False: A urine culture growing >100,000 CFUs of *Pseudomonas aeruginosa* in a stable patient with a foley catheter (bladder catheter was switched out prior to obtaining the culture) and no fever or localizing symptoms still requires treatment with antibiotics to prevent complications.
3. When should urine cultures be obtained in a patient with a foley catheter in place?
 - a. When the urine appears cloudy / foul smelling & after the catheter has been replaced
 - b. When symptoms suggestive of a UTI are present & after the catheter has been replaced
 - c. Immediately when symptoms suggestive of a UTI are present to prevent delay
4. True or False: An elevated procalcitonin in a newly admitted patient with COVID-19 indicates bacterial co-infection and a need to start antibiotics?

Answers to last Newsletter's quiz: 1. D, 2. True, 3. C., 4. A



ASP Gold Star Winners for January 2021

The Antimicrobial Stewardship team would like to recognize **Jason Lau** for his dedication to combatting antimicrobial resistance and commitment to the principles of antimicrobial stewardship:

Fun Microbe Fact:

Cupriavidus metallidurans thrives in environments rich with heavy metals which are typically toxic to most other bacteria. To survive these harsh environments it produces an enzyme, CopA, which takes one particular mineral, aqueous gold, and precipitates it back into its non-toxic metallic form. The end result is tiny, harmless gold particles which contribute to the formation of secondary deposits that form as a part of the weathering process of geologically created primary ores.

Contact Us

The Antimicrobial Stewardship Program team members

Adult ASP Physicians:

Stuart Cohen, MD
Archana Maniar, MD
Sarah Waldman, MD
Scott Crabtree, MD
Natascha Tuznik, DO
Christian Sandrock, MD
Larissa May, MD
Angel Desai, MD
Naomi Hauser, MD
Alan Koff, MBBS

Pediatric ASP Physicians:

Natasha Nakra, MD
Jean Wiedeman, MD
Ritu Cheema, MD
Elizabeth Partridge, MD

ASP Pharmacists:

Monica Donnelley, PharmD
Nicola Clayton, PharmD
Jen Curello, PharmD
James Go, PharmD

Antibiotic questions? Contact us.

See the On-Call Schedule for the ASP attending/fellow of the day

Contact the ASP Pharmacist at 916-703-4099 or by Vocera "Infectious Disease Pharmacist"