UC Davis Health Antimicrobial Stewardship Program

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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: Trichina worm by Alfred T. Lamme from Columbia University. 1976 Photomicrography Competition | Nikon's Small World. https://www.nikonsmallworld.com/galleries/1976-photomicrography-competition/trichina-worm

In This Issue

Chronic Obstructive Pulmonary Disease Exacerbations

Diagnosis

- Distinguishing chronic obstructive pulmonary disease (COPD) exacerbations and community-acquired pneumonia (CAP) in a patient with a known history of COPD can be challenging.
- If a chest x-ray does not show evidence of a new infiltrate, a COPD exacerbation is more likely.
- Antibiotics are recommended for **moderate to severe** COPD exacerbations.
  - Patients admitted for COPD exacerbation usually meet criteria for antibiotic treatment.
  - For outpatients, at least two of the following three symptoms are necessary for moderate-to-severe COPD: increased dyspnea, increased sputum volume, or increased sputum purulence.
- The most common bacteria associated with COPD exacerbations include *Haemophilus influenzae and Streptococcus pneumoniae*.
- *Pseudomonas* and *Enterobacteriaceae* are less common and usually observed only in COPD patients with extensive antibiotic exposure.

Treatment

- Fluoroquinolones are discouraged unless the patient has a known history of infection due to organisms resistant to standard therapy.
  - Azithromycin 500 mg po once daily for 3 days
    - Azithromycin has a long half-life; 3 days provides coverage for ~ 1 week
  - Doxycycline 100 mg po twice daily for 5 days

- Prophylactic antibiotics for patients with recurrent COPD exacerbations (at least two per year)
  - Have been shown to modestly decrease the number of COPD exacerbations.
  - Should only be considered in those who are already receiving maximized non-antibiotic options (e.g., bronchodilators, anti-inflammatory agents, anti-cholinergics).
  - The decision to initiate prophylaxis should be made on a case-by-case basis taking into account frequency of exacerbations, patient preferences, potential risk factors, and financial constraints, with input from the the patient's pulmonologist and/or primary care provider.
  - Recommended prophylactic regimens are azithromycin 250 mg orally daily or 250–500 mg three times a week.
  - Azithromycin use has been associated with QTc prolongation, and prolonged use has been associated with ototoxicity; appropriate monitoring should be utilized.

References

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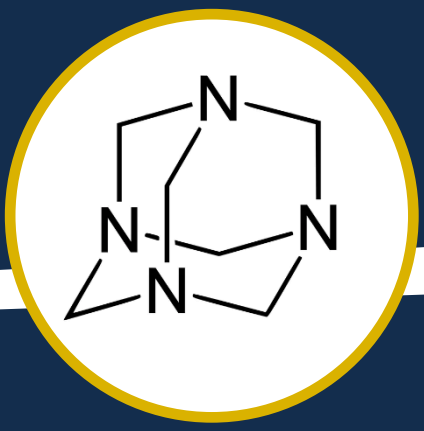
Methenamine

A prophylactic for recurrent UTI



Methenamine is a prophylactic antiseptic for patients with recurrent UTI found in 2 recent, open-label RCTs to be non-inferior to antimicrobial prophylaxis.

Methenamine:

- Cleaved into $NH4^+$ and formaldehyde in the bladder
- Received initial FDA approval in 1967
- Initial studies showed mixed results as a UTI prophylactic, but were small and of generally limited quality
- A 2012 Cochrane review of above data provided lukewarm support:

"Methenamine hippurate may be effective for preventing UTI in patients without renal tract abnormalities, particularly when used for short-term prophylaxis. It does not appear to work in patients with neuropathic bladder or in patients who have renal tract abnormalities."

- **Finally, 2 well designed, well powered RCTs were published in 2022**[1,2]
  - **Non-inferior to antibiotics in women w/o GU abnormalities**
- Given 100 mg PO BID
- Generally safe and well-tolerated with limited GI side effects

RCT 1: Harding C, et al. BMJ. 2022 Mar 9;376:e068229.
RCT 2: Botros C, et al. Int Urogynecol J. 2022 Mar;33(3):571-580.

Test Your Knowledge

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

A 50-year-old man presents to the ED with 3 days of SOB and purulent cough. CXR is normal. He is diagnosed with a COPD exacerbation but is stable enough to go home. The medical student reviews the COPD exacerbation criteria with you prior to stating their plan: increased dyspnea, increased sputum volume, and increased sputum purulence.

1. How many of the 3 clinical criteria must typically be met to be categorized as moderate to severe exacerbation possibly benefiting from antibiotics?
   a. 1
   b. 2
   c. 3
   d. It doesn't matter, antibiotics are never indicated for COPD exacerbations

2. The decision is made to start the patient on antibiotics for a moderate to severe COPD exacerbation. He has no significant cardiac history, and his EKG is normal. Which antibiotic is recommended?
   a. Azithromycin 500 mg PO daily x 3 days
   b. Levofloxacin 750 mg PO daily x 5 days
   c. Amox-clav 875-125 mg PO BID x 7 days
   d. Cefpodoxime 200 mg PO BID x 5 days

3. True or False: The patient calls and reports he threw up the first dose of azithromycin after severe nausea. In this case levofloxacin would be the next recommended antibiotic.

4. Which of the following statements about methenamine is <u>false</u>?
   a. Methenamine has been show in clinical trials to be an effective prophylactic for recurrent UTI
   b. Methenamine was only recently patented and typically requires prior authorization due to cost
   c. Methenamine is generally safe and well tolerated aside from some GI side effects
   d. Methenamine is an antiseptic, cleaved into formaldehyde and $NH4^+$ in the bladder

Answers to last Newsletter's quiz: 1. A, 2. True, 3. C, 4. T

ASP Gold Star Winners for May & June

The following staff have been recognized by the ASP team for their dedication to combatting antimicrobial resistance and commitment to the principles of antimicrobial stewardship:

- Jaida West (Gen Surg)
- Sarah Singh (Gen Surg)

Quick Antibiotic Fact:

Trimethoprim-Sulfamethoxazole

An oral antibiotic with excellent bioavailability, it can produce a pseudo-AKI through impaired secretion of creatinine. Real renal toxicity can happen, but is uncommon.

Antibiotic Escape Room!

You're trapped!

You are given a list of 9 bacteria. Use your knowledge of microbiology to escape. Some numbers may be used once, more than once, or not at all.

What is the 3-digit code (?-?-?) to escape?

Hepatic abscess
Gram-negative bacillus
Positive string test

Smells like butterscotch
Gram-positive coccus, chains
Abscessogenic

Bacteremia
Gram-positive coccus, chains
Colonoscopy

1. *Cutibacterium acnes*
2. *Streptococcus pyogenes*
3. *Enterococcus faecalis*
4. *Streptococcus anginosus*
5. *Fusobacterium necrophorum*
6. *Pseudomonas aeruginosa*
7. *Klebsiella pneumoniae*
8. *Moraxella catarrhalis*
9. *Streptococcus gallolyticus*

? - ? - ?

modified from:

Created by: Dr. Shaqil Peermohamed MD MPH FRCPC
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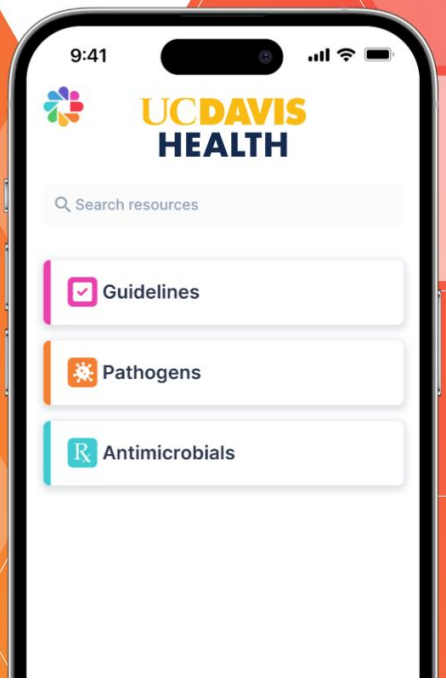
answer on last page…

UCDAVIS HEALTH

Mobilizing to defeat antimicrobial resistance together

DOWNLOAD FIRSTLINE

Firstline



Firstline is now live!

Firstline is a mobile app & website with **UC Davis Health specific content**, including:

- Infectious Diseases clinical guidelines (including our antibiogram)
- Antimicrobial information: dosing guidance, use restrictions, formulary/cost information, associated policies, etc.
- Pathogen information: precautions, antibiogram susceptibilities, preferred treatment options, etc.

Access is **free** & **easy** (it takes < 60 seconds to download & setup)

- Free to download on Android & Apple devices (scan QR code above)
- Just click "Select location" and choose UC Davis Health
- Or access via website:
  - https://app.firstline.org/en/clients/103-uc-davis-health/dashboard

Contact Us

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Antibiotic questions? Contact us.

https://health.ucdavis.edu/antibiotic-stewardship/

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"

Escape Room answer: 7-4-9