



UC Davis Health Antimicrobial Stewardship Program - Vol 2 Issue 4

Pseudohyphae protruding from material clumped together in a blood culture. (Candida albicans, 400X, gram stain). From: <http://thunderhouse4-yuri.blogspot.com/>

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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.

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Chronic Obstructive Pulmonary Disease Exacerbations



COPD Exacerbation 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.

COPD Exacerbation Treatment

- Fluoroquinolones are discouraged unless the patient has a known history of infection due to organisms resistant to standard therapy as they are associated with a greater risk of side effects and selection for resistant organisms.
 - 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.

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The 5 D's of Antibiotics

The goal of antimicrobial stewardship programs is to improve patient outcomes and also to make your life easier. Luckily each individual clinician can contribute to the antibiotic stewardship effort. Check out these suggestions (the 5 D's) below and how we can apply them to ED practice. More information can be found at: <https://www.acepnow.com/article/5-tips-to-improve-antibiotic-stewardship-in-your-emergency-department/>

Right Diagnosis: Call a virus a virus. Acute otitis media, bronchitis, sinusitis—all of these are far more often caused by viruses than bacterial. When the patient is not seriously ill and you suspect a viral syndrome, make the call and avoid antibiotics.

Right Drug: For patients with uncomplicated bacterial infections, consult our ED antibiogram and empiric antibiotic guidelines found on the ASP website (under "guidelines") to identify the most common causative organism and narrowest spectrum agent that is typically effective (e.g. nitrofurantoin for *Escherichia coli*).

Right Dose: Practice weight-based dosing of antibiotics for pediatric patients and for non-critically ill adults, err on the low side of the suggested dose range.

Right Duration: Contrary to what we would expect, the recommended length of most antibiotic regimens was chosen arbitrarily in initial studies and has been subject to inertia ever since. When offered a range of duration of therapy, choose the shortest duration. If you are prescribing any antibiotic for more than 7 days, consider a shorter course.

Right De-escalation: Consider documenting a de-escalation plan. Emergency physicians make decisions that generate therapeutic momentum for inpatient antibiotic prescribing. Simply writing in the chart, "these broad-spectrum agents should be narrowed to a single-effective agent once culture results have returned" can serve as a reminder to inpatient house staff and potentially save your patients days of unnecessary antibiotics.

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 50 year old man with morbid obesity and diabetes presents to the ED with productive cough and shortness of breath and is found to have a COPD exacerbation. He now requires supplemental O₂ but is in no respiratory distress eating a sandwich while reclining in his bed in the V pod. His CXR shows no acute cardiopulmonary disease. He is afebrile though his WBC count trended up from 8.5 to 10. An EKG shows a QTc of 510. He is admitted for further treatment and is started on antibiotics.

1. Which antibiotic regimen would be most appropriate?

- a. Doxycycline 100 mg PO q12h
- b. Azithromycin 500 mg PO q24h
- c. Levofloxacin 750 mg PO q24h
- d. Piperacillin-tazobactam 3.375 g IV q8h

2. True or False: The patient's nurse asks whether the patient needs to be treated with intravenous antibiotics since he is admitted to the hospital. Given the patient's stability, tolerance of an oral diet, and adequate empiric coverage and bioavailability of his selected regimen there is no benefit to intravenous antibiotics over oral.

3. The patient rapidly improves and he is ready for discharge by the next hospital day. He has had numerous prior COPD exacerbations within the past year in spite of being on maximal inhaled and oral COPD medications. He has been hospitalized multiple times for these exacerbations. He is therefore started on antibiotic prophylaxis to reduce the frequency of his exacerbations and need for hospitalization. Assuming his QTc were to significantly improve which antibiotic regimen would be most appropriate?

- a. Trimethoprim-Sulfamethoxazole 1 DS tab PO daily
- b. Azithromycin 250 mg PO daily
- c. Levofloxacin 500 mg PO daily
- d. Amoxicillin 500 mg PO twice daily

4. What are the 5 D's of antibiotics?

- a. Right Date, Right Dose, Right Delivery, Right Drug Interactions, Right Discussion

b. Doxycycline, Daptomycin, Dalbavancin, Doripenem, Dicloxacillin

c. Right Diagnosis, Right Drug, Right Dose, Right Duration, and Right De-escalation

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

ASP Gold Star Recognition



With the SARS-CoV-2 pandemic monopolizing everyone's time the Stewardship team's priorities have been on optimizing care for COVID-19 patients. No new Gold Stars have been awarded since last newsletter. More to come!

Meet the Stewardship Team



Angel Desai is one of the newest members of the division of Infectious Diseases where she works on the Infection Prevention team. She completed her ID fellowship in 2019 at Massachusetts General Hospital and internal medicine residency at the University of Washington in 2016. Her areas of interest include surveillance of emerging infectious diseases with a focus on outbreaks, tropical medicine, migration health, and infection prevention. Outside of work, Angel is an avid hiker, baker, and self-proclaimed smoothie aficionado.

Fun Microbe Fact

In 2014 scientists performed one of the largest studies to date of the cheese microbiome sampling the bacterial and fungal flora of 137 cheeses from 10 different countries. Aside from noting that a single gram of cheese could contain up to 10 billion microorganisms researchers identified specific patterns of microflora for specific cheese types. Particularly surprising was the identification of *Vibrios* and *Pseudoalteromonas* in sea salt infused cheeses whose microbial companions likely came along for the ride in the brining process. Moisture levels were the predominant driving factor determining microbial flora. Country of origin, on the other hand, was not.

Read more: <https://www.wired.com/2014/07/cheese-rind-microbes/>

Contact Us

The Antimicrobial Stewardship Program Team Members

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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 Vocera "Infectious Disease Pharmacist"