A petri dish containing a red agar medium. The agar surface is covered with a complex, branching, tree-like pattern of white bacterial colonies, resembling a lung or a coral reef. The pattern is highly detailed and symmetrical, radiating from a central point. The background of the image is a light, neutral color.

# 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: "Tree, lungs of the planet." Salmonella on Brilliant Green Agar. 2021 ASM agar art contest. Submitted by: Litzy Amairany Arroyo Aranda, Juan Carlos Elizalde & David Rangel Castro from Benemérita Universidad Autónoma De Puebla. <https://asm.org/Events/ASM-Agar-Art-Contest/2021-Winners>*

## In This Issue

- COPD Exacerbations: What You Need to Know
- The Daily Risk for C diff
- Monkeypox in the News
- Test Your Knowledge
- ASP Gold Star Winners for May 2022

# Chronic Obstructive Pulmonary Disease Exacerbations



## Diagnosis

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- 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

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- 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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# The Daily Risk for C diff

Question: for similar indications and populations, what is the sequential risk for C diff infection with every additional day of antibiotics?

The Study: the records of all Ontario's nursing home residents (age >66) from 2012-2017 were reviewed (n=149,916 days), & the 90-day adjusted incidence of C diff was calculated stratified by antibiotic receipt, their type, & duration.

Individuals with recent C diff, recent hospitalization, or multiple antibiotic courses were excluded. Rates were adjusted for 14 covariates including age, prior hospital visits, comorbidities, functional status, PPI use, and distant h/o C diff. Brown K, et al. *CID*. 2020;72(5):836-44

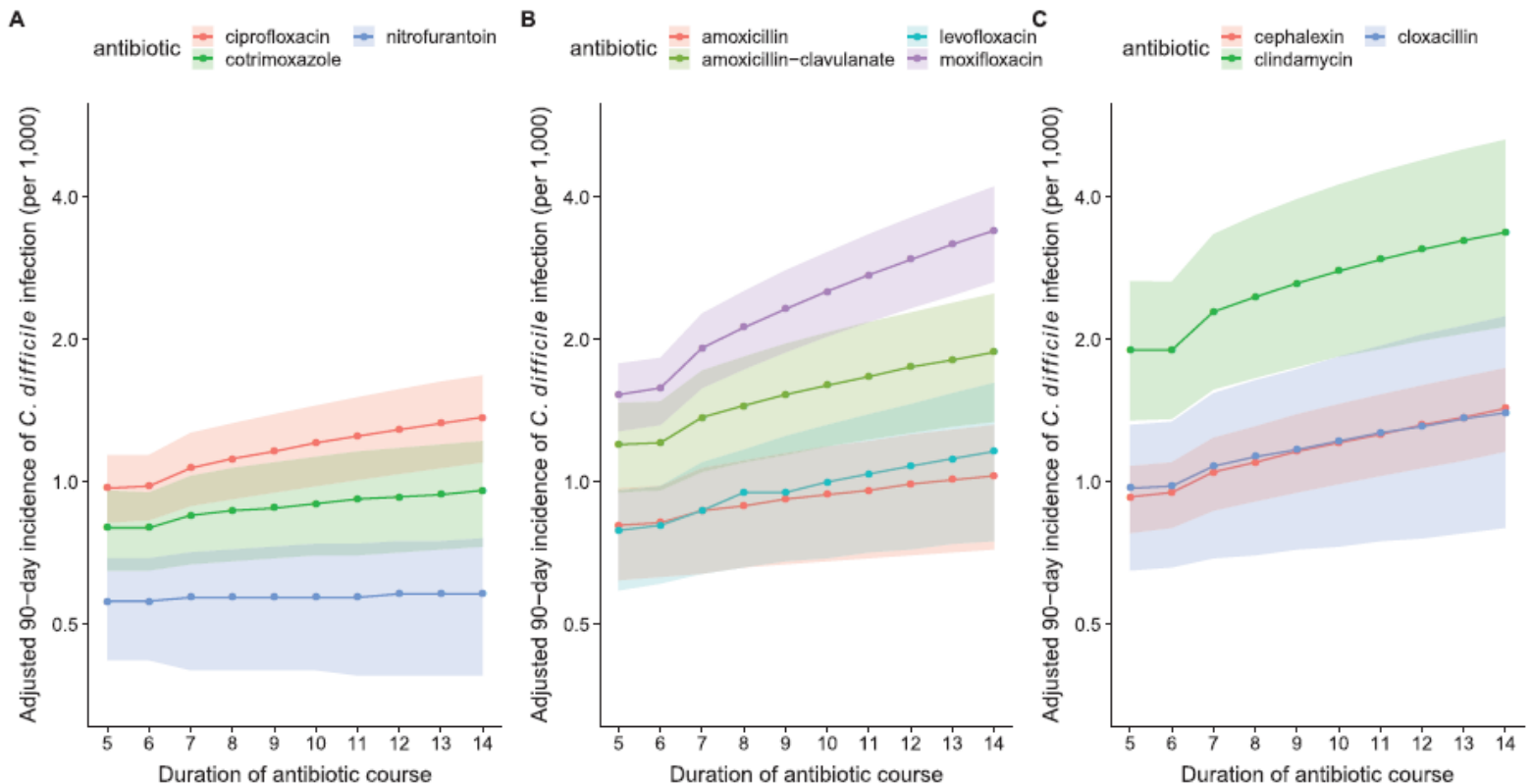
The Answer:

90-day adjusted incidence of C diff

UTI

PNA

cellulitis



**Figure 3.** Adjusted 90-day incidence of *C. difficile* infection (per 1000 residents) for (A) ciprofloxacin, cotrimoxazole, nitrofurantoin, (B) amoxicillin, amoxicillin-clavulanate, levofloxacin, moxifloxacin, and (C) cephalixin, clindamycin, cloxacillin, for durations of 5 to 14 days. Shaded regions represent 95% confidence intervals.

Most but not all antibiotics (nitro & tetracyclines excluded) carried some C diff risk, and higher risk antibiotics (clinda, the fluoroquinolones, 3<sup>rd</sup> gen CSPNs) had greater increases in risk w/ every additional day of treatment.



# 2022 United States Monkeypox Case

1 confirmed US case as of 5/18/22, multiple suspected cases being investigated

As of 5/24/22 there have been 100+ confirmed cases in Europe and Canada. Although primarily a zoonosis, human to human transmission is possible. Prompt diagnosis is important as monkeypox is **transmissible through close contact and respiratory droplets** though prolonged face-to-face contact is typically required.

Eradicated 1980



## Clinical Presentation:

from: McCollum A, Damon I. *CID*. 2014 Jan;58(2):260-7.

	Chickenpox	Monkeypox	Smallpox
Prodrome period	0-2 days	7-17 days	7-17 days
Rash period	10-21 days	14-28 days	14-28 days
Fever + malaise	Yes	Yes	Yes
Headache	Yes	Yes	Yes
Lymphadenopathy	No	Yes	No
Rash Distribution	Centripetal	Centrifugal	Centrifugal
<p>Note: in the current outbreak, lesions are being reported in an anogenital distribution in some cases.</p> <p>modified from: www.centerforhealthsecurity.org/our-work/pubs_archive/pubs-pdfs/fact_sheets/smallpox.pdf</p>	<p>CHICKENPOX</p>	<p>MONKEYPOX</p>	<p>SMALLPOX</p>
Lesions on palms soles	Rare	Yes	Yes
Lesion appearance	Superficial "Dew drop on rose petal"	Hard, deep Umbilicated	Hard, deep Umbilicated
Lesion progression	Multiple stages	One stage	One stage
Lesion discomfort	Typically itchy	Painful	

## Rash Evolution & Duration:

from: www.cdc.gov/poxvirus/monkeypox/clinicians/clinical-recognition.html



## 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](mailto:hs-ASP@ucdavis.edu) to be entered into a raffle for a free lunch!

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 antibiotic classes are most associated with risk for *Clostridioides difficile* infection?
  - a. Piperacillin-tazobactam, the fluoroquinolones, and aztreonam
  - b. Doxycycline, nitrofurantoin, and fosfomycin
  - c. Trimethoprim-sulfamethoxazole, the macrolides, and amoxicillin
  - d. Clindamycin, the fluoroquinolones, and 3<sup>rd</sup> generation cephalosporins

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

## ASP Gold Star Winners for May 2022



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:

- Brittany Newton (ED)

### Fun Microbe Fact:

Bacteria have been found even deep in the earth. Tests of South African mine shafts 3-5 km underground at high pressure, high temperature, and without oxygen have found life growing thanks in part to the decomposition of water and sulfur by radioactivity from nearby uranium.

[https://microbewiki.kenyon.edu/index.php/Deep\\_Rock\\_Sediment](https://microbewiki.kenyon.edu/index.php/Deep_Rock_Sediment)

## 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 by Vocera "Infectious Disease Pharmacist"**