

Fighting the Temptation:

Bacterial Infections That Don't (always) Require Antibiotics

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Overview

- Acute Sinusitis
- Acute bronchitis
- COPD
- Diverticulitis

Acute Bacterial Rhinosinusitis



- 2025 Adult Sinusitis Guidelines:
- More than 1 in 5 antibiotics prescribed in adults are for sinusitis
- Sinusitis affects approximately 12% of adults in the United States resulting in over 30 million annual diagnoses.

Payne, S.C. et al. *Otolaryngol Head Neck Surg*, 173: S1-S56. <https://doi.org/10.1002/ohn.1344>

Acute Bacterial Rhinosinusitis



- Rhinosinusitis:
 - Purulent nasal drainage
 - AND
 - Nasal obstruction or Facial pain-pressure-fullness or Both
- Imaging not generally indicated
- Potential Bacterial RS:
 - Symptoms with no improvement after 10 days
 - OR
 - Double worsening within 10 days

Payne, S.C. et al. *Otolaryngol Head Neck Surg*, 173: S1-S56. <https://doi.org/10.1002/ohn.1344>

Acute Bacterial Rhinosinusitis



- Fever has a sensitivity and specificity of only about 50% for ABRS
- Only 0.5% to 2.0% of ARS episodes are complicated by bacterial infection.
- Nasal cultures correlate poorly with maxillary sinus cultures
- **Clinicians should offer watchful waiting (without antibiotics) for adults with uncomplicated ABRS with assurance of follow-up.**
- How long to wait? Guideline says 3-5 days, some experts say up to a week

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Acute Bacterial Rhinosinusitis

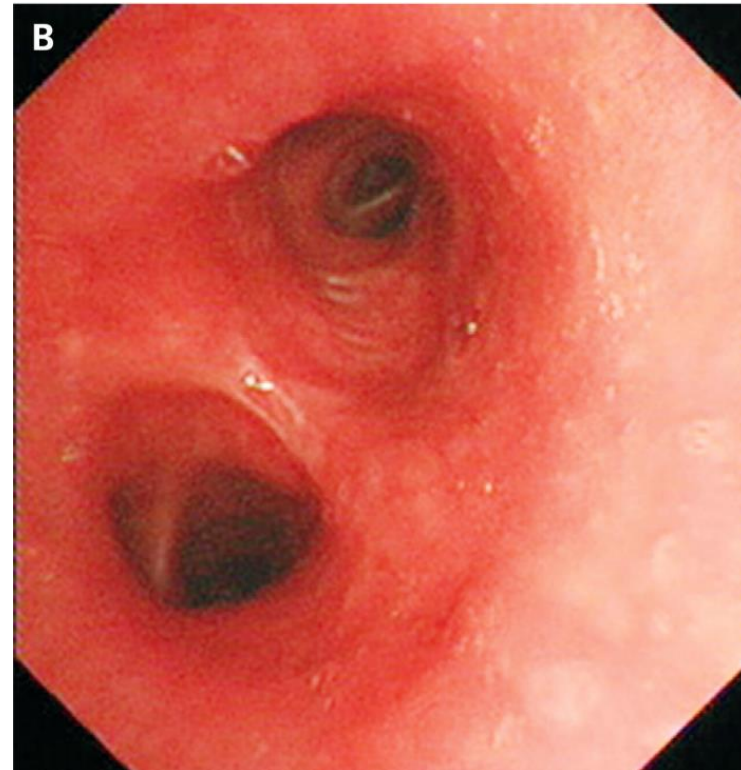
- Systematic Review^a : 15 trials, >3000 patients
 - 64% spontaneous recovery after 2 weeks
 - NNTB 19, NNTH 9
- Selecting an antibiotic:
 - Amoxicillin or amoxicillin-clavulanate?
 - Likely not much of a difference^b

a. Lemiengre MB et al., *Cochrane Database Syst Rev.* 2018

b. Savage TJ et al., *JAMA.* 2026;335(19):1694–1705. doi:10.1001/jama.2025.26902

Acute Bronchitis

- Definition: Acute (<3 weeks) infectious cough without evidence for pneumonia
- Subacute: 3-8 weeks
- Chronic: >8 weeks



1. Derived from Smith MP et al., Chest. 2020 May;157(5):1256-1265

Acute Bronchitis

- About 60% of acute bronchitis had virus detected (more than pneumonia or COPD or asthma) in series 780 patients with acute respiratory symptoms¹
- Bacteria were only detected in 6% of these cases
- Unlike COPD, sputum purulence has no association with bacterial etiology² but is a common reason to prescribe antibiotics (specificity of 46%)²

1. Clark TW et al., *J Infect.* 2014 Nov;69(5):507-15.
2. Altiner A et al., *Scand J Prim Health Care.* 2009;27(2):70-3.

Acute Bronchitis

- Typical respiratory pathogens (*S. pneumoniae*, *H. flu*, *Moraxella*) do NOT typically cause bronchitis without underlying lung disease
- More likely due to atypical organisms (*B. pertussis*, *Mycoplasma*, *Chlamydia pneumoniae*) which are **uncommon**¹
- What IS unfortunately common? Prescribing antibiotics for acute bronchitis²

1. Jain S et al., *N Engl J Med*. 2015 Jul 30;373(5):415-27.

2. Stenehjem E et al., *Clin Infect Dis*. 2020 Apr 10;70(8):1781-1787.

Acute Bronchitis

- ACP, NIH, ACCP, IDSA, CDC, all recommend strongly against routine use of antibiotics for acute bronchitis
- Acute bronchitis from *Mycoplasma* or *C pneumoniae* is typically self-limited and doesn't benefit from treatment



Pertussis

- Incidence among adults is increasing
- “90 day cough”
- Most accurate test is a PCR from an NP swab (if <4 weeks)
- CDC recommends treatment if diagnosed within 3 weeks (6 weeks for pregnant women)
 - Will likely not change symptoms at all, but might reduce transmission
- Treatment of choice is azithromycin

New Orders

Bordetella pertussis/parapertussis
PCR

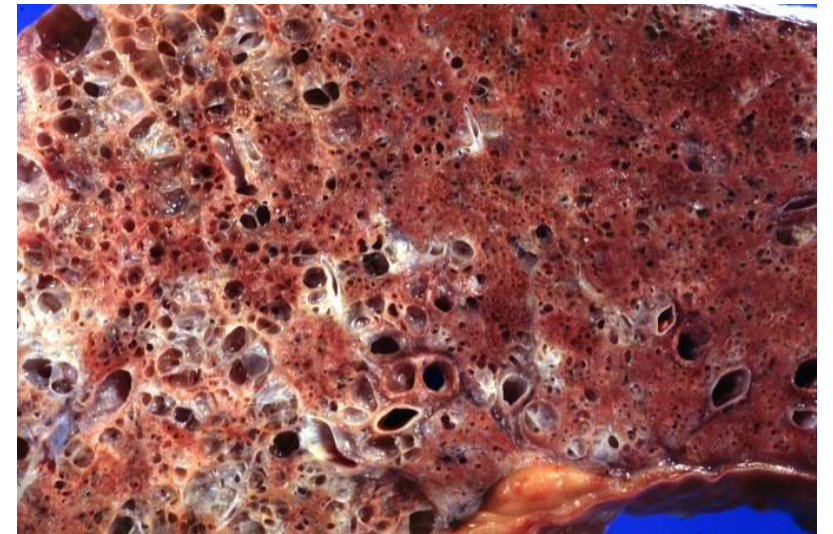
Morning draw, First occurrence tomorrow at 0600,
Last occurrence tomorrow at 0600, For 1 occurrence

Release Result to Patient: Immediate

Nasopharyngeal Swab

COPD Exacerbation

- Acute (<14 day) increase in baseline symptoms^a
- Most common cause is infection (70%)
- Bacterial etiology felt likely, difficult to prove (not invasive)
- Exacerbation associated with acquisition of a new strain of bacteria^b



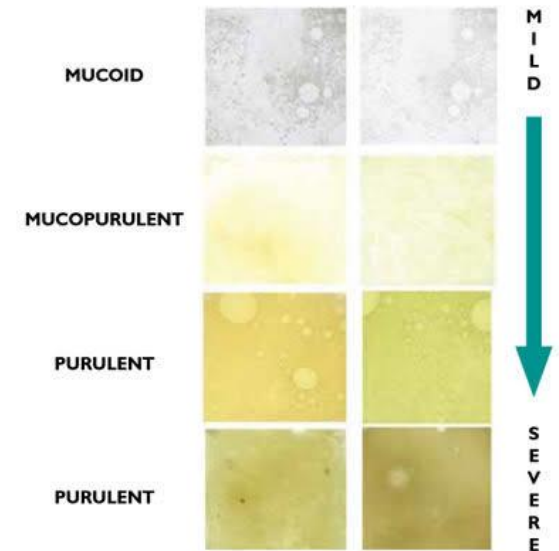
UAB

a. *Global Initiative for Chronic Obstructive Lung Disease (GOLD)*

b. *Sethi S et al., N Engl J Med. 2002 Aug 15;347(7):465-71.*

COPD Exacerbation

- When to use antibiotics
 - The more severe, the more benefit^a
- "Anthonisen Criteria"
 - Increased dyspnea
 - Increased sputum purulence
 - Increased sputum volume
- Sputum purulence most predictive of bacterial etiology^b
- Outpatients generally do not benefit^c
- Sputum culture not usually indicated (suspicion for *Pseudomonas*? Treatment failure?)



a. Anthonisen NR et al., *Ann Intern Med.* 1987 Feb;106(2):196-204.

b. Soler N et al., *Thorax.* 2007 Jan;62(1):29-35.

c. Van Velzen P et al., *Lancet Respir Med.* 2017 Jun;5(6):492-499

COPD Exacerbation

- What antibiotics and how long?
- Options:
 - Azithromycin*
 - Doxycycline*
 - Amoxicillin
 - Amox-clav*
 - Cefpodoxime
 - Levofloxacin*

*Top choices per GOLD

Susceptibilities of Respiratory Pathogens

| Organism | Amoxicillin | Amox-Clav | Ceftriaxone | Azithromycin | Doxycycline | TMP-SMX | Levofloxacin |
|----------------------|-------------|-----------|-------------|--------------|-------------|---------|--------------|
| <i>S pneumoniae</i> | 93% | 93% | 96% | 65% | 76% | 72% | 98% |
| <i>H influenzae</i> | ~75% | >90% | 100% | 98% | 99% | 65% | 99% |
| <i>M catarrhalis</i> | x | 100% | 100% | 100% | 99.60% | 97% | 99% |

In-Vitro Susceptibilities Aren't Everything

- Amoxicillin may be enough for many patients¹
- If high risk for *Pseudomonas* colonization or resistant organisms, can get a sputum culture:
 - Frequent exacerbations w/ antibiotic treatment
 - Bronchiectasis on imaging
 - Severe COPD (FEV1 <30% predicted)
 - Chronic steroids

1. Bagge K et al., *Respir Res.* 2021 Jan 7;22(1)

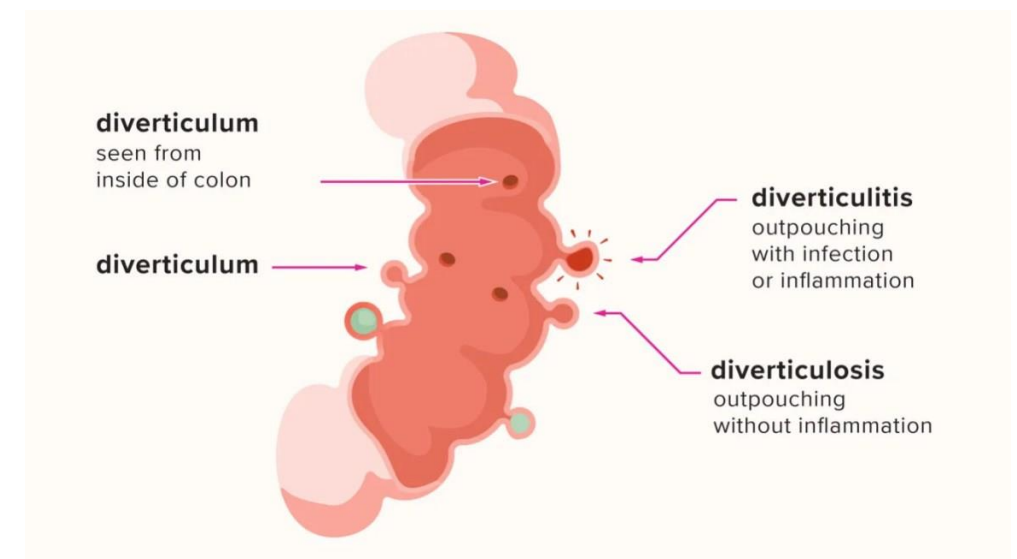
COPD Exacerbation

- 3 days is fine for most CAP, is 3 days fine for COPD?
- Guidelines say 5 days or less
- This needs to be studied



Diverticulitis

- About 4% risk of diverticulitis in patients with diverticulosis over 11 years of follow-up¹
- Uncomplicated diverticulitis can be safely treated outpatient (DIVER trial)²
- Diverticulitis complications:
 - Abscess
 - Perforation
 - Obstruction
 - Fistulization



1. Shahedi K et al., *Clin Gastroenterol Hepatol.* 2013 Dec;11(12):1609-13
2. Biondo S et al., *Ann Surg.* 2014 Jan;259(1):38-44

Diverticulitis

- Other indications for admission:
 - Sepsis
 - Age >70
 - Immunocompromise
 - Uncontrollable pain
 - Unable to tolerate PO intake
 - Won't follow-up
 - Multiple co-morbidities

Outpatient Management of Diverticulitis

- DINAMO Study (2021): Prospective open-label RCT in Spain
 - 480 patients with uncomplicated AD randomized to supportive care or supportive care + amox-clav
 - Primary endpoint: Hospitalization
 - Antibiotics group: 5.8%
 - No antibiotics group: 3.3%
 - No-antibiotics group also non-inferior for unscheduled ED visits and uncontrolled pain
 - Conclusion: Antibiotics provide **no** benefit for outpatients with uncomplicated diverticulitis

1. Mora-López L et al., *Ann Surg.* 2021 Nov 1;274(5):e435-e442

Questions?