

# Antibiotic Commonsense

"An investment in knowledge always pays the best interest." Benjamin Franklin



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## Antibiotic Stewardship:

### When to Withhold and When to Stop Antibiotics (Part 2)

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Researchers estimate that up to 50% of all antimicrobials prescribed are inappropriate or unnecessary.<sup>1</sup> Antibiotic resistance is directly associated with antibiotic use and most antibiotic-resistant infections will occur in the general community.

We continue our *Antibiotic Commonsense* review, started in the May/June issue, of current evidence for diagnosing and treating selected common infections in an effort to improve prescribing practices in our community.

#### Acute Bronchitis

Acute bronchitis involves self-limited inflammation of the bronchial epithelium characterized by cough lasting more than five days without evidence of pneumonia.<sup>2</sup> The majority of cases ( $\geq 90\%$ ) have a nonbacterial, often viral, etiology (e.g., influenza A and B, parainfluenza, coronavirus, rhinovirus, respiratory syncytial virus, and human metapneumovirus). Indeed, there is no convincing evidence to support the notion of the clinical entity "acute bacterial bronchitis" aside from patients with altered airways (e.g., COPD, endotracheal intubation, tracheostomy).

Several randomized trials have definitively shown antibiotics have no significant impact on duration or severity of illness.<sup>2</sup> Despite clear evidence and guidelines, prescribing rates for this illness remain high, with an antibiotic prescribed in approximately 70% of cases from 1996–2010.<sup>3</sup>

Acute bronchitis must be differentiated from more severe illness that may require antibiotics, including pneumonia.<sup>4</sup> The absence of systemic symptoms (fever, tachycardia, tachypnea) and lack of chest examination findings suggesting pulmonary parenchymal consolidation reduces the likelihood of pneumonia; further diagnostic testing is often unnecessary.<sup>2</sup> Chest radiography is recommended for patients with any of these findings or cough duration exceeding three weeks.

The presence of purulent sputum should not be used alone to identify bacterial respiratory infection as this sloughing of inflammatory cells and epithelial mucus may be caused

by both viral and bacterial infections.<sup>5</sup> A recent trial comparing placebo to treatment with either amoxicillin/clavulanate or ibuprofen in adults presenting with less than one week of cough with purulent sputum found no significant difference in duration of cough between the three groups, supporting the notion that sputum purulence is not predictive of bacterial infection.<sup>6</sup>

Given the higher likelihood for atypical disease presentation, the evaluation and management of geriatric populations and those with underlying chronic pulmonary disease or immunosuppression should be tailored with a higher index of suspicion for pneumonia.<sup>2</sup> Acute bronchitis due to *Bordetella pertussis* remains the only setting in which antibiotics have been demonstrated to be of benefit.

Treatment options for all other patients with acute bronchitis are limited to supportive care. Albuterol therapy may provide benefit in patients with evidence of airflow limitation or bronchospasm, present in up to 40% of cases.<sup>7</sup> Dextromethorphan, codeine, guaifenesin, and antihistamine-decongestants appear to have limited efficacy for significant cough and symptom relief, though they may be effective for quick, short-term reduction in cough frequency and severity.<sup>8</sup> Patients presenting with associated common cold symptoms may find symptomatic treatment with these agents, in addition to a nonsteroidal anti-inflammatory, acetaminophen, and/or ipratropium beneficial.<sup>8</sup>



For the uncomplicated patient with acute bronchitis for whom antibiotics are not indicated, providers should explain that this illness is a "chest cold" usually caused by a virus, which cannot be treated with antibiotics, offer potential supportive measures, and provide the patient with a realistic expectation for the duration of their cough, typically 10–14 days after the office visit. Coughs lasting greater than 2–3 weeks generally merit re-evaluation.

#### Acute Sinusitis

Acute sinusitis is characterized by mucosal inflammation of the nasal and paranasal sinuses lasting up to four weeks.<sup>9</sup>

The majority of these cases (90–98%) are due to the same viral pathogens commonly associated with the common cold and acute bronchitis. Secondary bacterial infection occurs in only 0.5–2% of adults and 5% of children.<sup>9,10</sup> In contrast to the low rate of true bacterial etiology, antibiotics are prescribed in up to 81% of cases.<sup>11</sup> Placebo-controlled trials have demonstrated that 70% of patients with sinusitis will improve even when given placebo.

Sinusitis is diagnosed based on the presence of clinical criteria (Table 1). However, these symptoms cannot differentiate bacterial from viral infection.<sup>9,10</sup>

**Table 1.** Criteria for diagnosis of sinusitis includes two major or one major and ≥ two minor symptoms<sup>9</sup>

Major symptoms	Minor symptoms
Purulent anterior nasal drainage	Headache
Purulent or discolored posterior nasal drainage	Ear pain, pressure, or fullness
Nasal congestion or obstruction	Halitosis
Facial congestion or fullness	Dental pain
Facial pain or pressure	Cough
Hyposmia or anosmia	Fever <sup>b</sup>
Fever <sup>a</sup>	Fatigue

<sup>a</sup> acute sinusitis only; <sup>b</sup> subacute or chronic sinusitis

The classic presentation of bacterial sinusitis with headache, facial pain, and fever is actually quite uncommon.<sup>9</sup> Symptoms that persistent beyond 10 days, are very severe (T >39°C with purulent drainage) for four consecutive days at the onset of illness, or worsen after initially showing improvement are most commonly associated with bacterial etiology. Radiographic studies are not recommended due to a low sensitivity and specificity and are not needed for diagnostic confirmation.

Patients that do not meet criteria suggesting bacterial infection should be managed with supportive care.<sup>10</sup> Nasal saline irrigation may be beneficial for both children and adults. However, intranasal and oral decongestants or antihistamines have not shown a benefit. Analgesics, antipyretics, and hydration should also be utilized for symptomatic relief.

If antibiotic therapy is indicated for suspected bacterial infection, the agent of choice is amoxicillin/clavulanate for both children and adults.<sup>9</sup> This provides adequate coverage of the most common pathogens, *Streptococcus pneumoniae* and *Haemophilus influenzae*, including β-lactamase producing organisms. Macrolides and trimethoprim-sulfamethoxazole are not recommended due to increasing rates of resistance. For patients with penicillin allergy, doxycycline or a respiratory fluoroquinolone is an alternate option for adults. A third generation cephalosporin plus clindamycin may be used for children with penicillin allergy. Antimicrobial duration should usually be 5–7 days for adults and 10–14 days for children. The addition of intranasal corticosteroids to the antimicrobial regimen may also improve symptoms.

## Summary

Educational and quality-related campaigns targeting appropriate antibiotic prescribing have existed for over a decade, yet prescribing rates continue to remain high. A variety of factors contribute to this, including diagnostic uncertainty in complex patients, medical liability concerns, and the belief that all patients want antibiotics and will not be satisfied until they are prescribed.<sup>12</sup> Patient satisfaction with the office encounter may not depend on the ultimate receipt of an antibiotic, but rather the perception of effective communication. For patients whose presentation favors a non-bacterial etiology, providers should strive to explain the nature of the illness, personalize the risks of unnecessary antibiotic use, and discuss the following:



- Antibiotic use is associated with significant side effects.
- Unnecessary antibiotic use may increase risk of carrying a drug-resistant pathogen, which may cause severe illness and make future antibiotics less effective.
- Antibiotic use may result in a severe diarrheal disease due to a “superbug” called *Clostridium difficile*. The prevalence of this complication is increasing in Western Washington and may lead to a disease that can be extremely difficult to cure and is occasionally fatal.

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