

Otitis media: Can shorter antibiotic courses truly deliver?

Written by The Life Science Feed Editorial Team · Edited by Mara Voss

Acute otitis media (AOM) remains a common paediatric infection, frequently managed with antibiotics. The prevailing clinical tension lies between effective eradication of bacterial pathogens and the global imperative to curb antimicrobial resistance by minimising antibiotic exposure. This has driven a sustained push towards shorter treatment durations, but the clinical reality is more complex than a simple reduction in pill count.

KEY TAKEAWAYS

- **The Pivot:** Shorter antibiotic courses for AOM are increasingly advocated to reduce resistance, but their effectiveness is not universal across all patient groups.
- **The Data:** While some shorter courses demonstrate non-inferiority in specific, uncomplicated cases, they often show higher rates of clinical failure or recurrence in younger children or those with more severe disease.
- **The Action:** Clinicians should carefully consider patient age, disease severity, and risk factors for recurrence when deciding on antibiotic duration for AOM, adhering to established guidelines that balance efficacy with resistance stewardship.

Acute otitis media, an inflammation of the middle ear, is a leading cause of antibiotic prescriptions in children. The condition typically presents with rapid onset of symptoms such as ear pain, fever, and irritability. Bacterial pathogens, primarily *Streptococcus pneumoniae*, non-typeable *Haemophilus influenzae*, and *Moraxella catarrhalis*, are responsible for the majority of cases. While many episodes of AOM resolve spontaneously, antibiotics are often prescribed to alleviate symptoms, prevent complications like mastoiditis, and reduce the risk of recurrence. The challenge for clinicians lies in identifying which children truly benefit from antibiotics and for how long, particularly given the rising concerns about antimicrobial resistance.

Standard treatment for AOM has historically involved 10-day courses of antibiotics, typically amoxicillin or amoxicillin-clavulanate. This duration was largely established through early clinical experience and observational studies, aiming for complete bacterial eradication and symptom resolution. But the widespread use of antibiotics, often for viral infections or unnecessarily prolonged courses, has contributed significantly to the development of resistant bacterial strains. This public health crisis has spurred efforts to re-evaluate treatment paradigms, with a particular focus on reducing antibiotic exposure without compromising patient outcomes. The goal is to find the shortest effective duration, balancing individual patient benefit with broader public health concerns.

The Rationale for Shorter Courses

The primary argument for shorter antibiotic courses in AOM rests on two pillars: reducing antimicrobial resistance and minimising adverse effects. Prolonged antibiotic exposure exerts selective pressure on bacterial populations, favouring the survival and proliferation of resistant strains. This phenomenon is well-documented across various infectious diseases, and AOM is no exception. By shortening the duration, the hope is to limit this selective pressure, thereby preserving the efficacy of existing antibiotics. Antimicrobial stewardship programs increasingly advocate for 'as short as possible, as long as necessary' prescribing principles.

Beyond resistance, shorter courses also aim to reduce the incidence of antibiotic-associated adverse events.

Gastrointestinal disturbances, such as diarrhoea, nausea, and vomiting, are common with many oral antibiotics. Skin rashes, including allergic reactions, also occur. These side effects can lead to poor adherence, treatment discontinuation, and unnecessary healthcare visits. A shorter duration theoretically translates to fewer days of potential discomfort for the child and less burden for parents, potentially improving overall treatment compliance. The convenience of a shorter regimen is also a factor, particularly in busy family lives.

Defining Efficacy and Failure

When evaluating antibiotic duration, efficacy is typically assessed by clinical success rates, defined as resolution of symptoms without the need for additional antibiotic therapy. Clinical failure, conversely, involves persistent or worsening symptoms, requiring a change in antibiotic or a longer course. Recurrence, a new episode of AOM within a specified timeframe (e.g., 30 days), is another critical endpoint, particularly for shorter regimens. The challenge in comparing durations lies in the heterogeneity of AOM presentations and patient populations. A mild, uncomplicated case in an older child may respond differently to a shorter course than a severe infection in an infant with a history of recurrent AOM.

The definition of 'shorter' also varies. While a 10-day course has been the traditional benchmark, studies have explored 5-day, 7-day, and even 3-day regimens. The choice of antibiotic, its pharmacokinetic and pharmacodynamic properties, and the local prevalence of resistant strains all influence the potential effectiveness of a reduced duration. For instance, antibiotics with prolonged post-antibiotic effects or higher middle ear fluid penetration might theoretically be more amenable to shorter courses. But these theoretical advantages must be rigorously tested in clinical settings to ensure patient safety and efficacy.

Where Shorter Courses Fall Short

Despite the compelling rationale, shorter antibiotic courses have not proven universally superior or even non-inferior to traditional 10-day regimens across all patient demographics. The most consistent finding is that younger children, particularly those under two years of age, and those with more severe AOM presentations, tend to have higher rates of clinical failure or recurrence with shorter courses. This is a critical distinction, as these are often the patients at highest risk for complications and who derive the most benefit from effective antibiotic therapy.

For instance, a 5-day course of amoxicillin, while effective in some older children with mild AOM, has been associated with significantly higher rates of treatment failure compared to a 10-day course in infants and toddlers. The immature immune systems of younger children, coupled with the potential for more aggressive or persistent infections, may necessitate a longer duration to achieve complete bacterial eradication and prevent relapse. Similarly, children presenting with high fever, severe otalgia, or bilateral AOM often require the full 10-day course to ensure adequate treatment.

response. These are not merely statistical differences; they represent real children experiencing prolonged illness, additional healthcare visits, and potentially more severe outcomes.

The specific pathogen also plays a role. While some studies suggest shorter courses might be adequate for infections caused by *Moraxella catarrhalis* or non-typeable *Haemophilus influenzae*, which are often less virulent, infections with *Streptococcus pneumoniae*, particularly drug-resistant strains, may demand a more sustained antibiotic presence. The increasing prevalence of penicillin-non-susceptible *S. pneumoniae* further complicates treatment decisions, as higher doses or longer durations of amoxicillin may be required, or alternative agents considered. This highlights the importance of local epidemiology and susceptibility patterns in guiding treatment choices, a factor often overlooked in broad guideline recommendations.

The Role of Clinical Guidelines

Current clinical guidelines for AOM, such as those from the National Institute for Health and Care Excellence (NICE) in the UK or the American Academy of Pediatrics (AAP) in the US, generally recommend a careful approach to antibiotic duration. They often suggest shorter courses (e.g., 5-7 days) for older children (typically 2 years and above) with mild-to-moderate, uncomplicated AOM. But for younger children (under 2 years), those with severe symptoms, or those with recurrent AOM, a 10-day course remains the recommended standard. This stratified approach acknowledges the varying risk profiles and potential for treatment failure across different patient groups.

These guidelines also emphasise the importance of watchful waiting in select cases of uncomplicated AOM, particularly in older children, to avoid unnecessary antibiotic exposure altogether. This strategy, however, requires careful patient selection and robust follow-up to ensure symptoms resolve and to initiate antibiotics if the condition worsens. The decision to prescribe antibiotics and their duration is therefore a complex clinical judgement, balancing the immediate needs of the patient with the broader public health implications of antimicrobial stewardship. For a deeper dive into managing common infections, the Oxford Handbook of Infectious Diseases and Microbiology provides practical guidance on antimicrobial therapy.

Unanswered Questions and Future Directions

Despite extensive research, several questions persist regarding optimal antibiotic duration in AOM. The precise mechanisms underlying treatment failure with shorter courses in specific populations are not fully elucidated. Is it insufficient bacterial killing, inadequate drug penetration, or a more complex relationship with the host immune response? Further research into biomarkers that can predict treatment response or identify children at higher risk of failure could help personalise antibiotic duration. This would move beyond broad age cut-offs to more precise, patient-specific recommendations.

The impact of viral co-infections, which are common in AOM, on antibiotic efficacy and optimal duration also warrants further investigation. Viral presence can complicate the clinical picture and potentially influence the bacterial load and inflammatory response, affecting how quickly a patient responds to antibiotics. The long-term effects of repeated short courses on the nasopharyngeal microbiome and the development of resistance are also areas of ongoing study. While a single short course may have minimal impact, cumulative exposure over multiple episodes could still contribute to the broader resistance problem. The field continues to seek a balance between effective treatment and responsible antibiotic use.

CLINICAL IMPLICATIONS

The push for shorter antibiotic courses in acute otitis media is laudable in its intent to combat antimicrobial resistance, but the clinical reality demands a careful approach. Blanket recommendations for reduced durations overlook critical patient characteristics, particularly age and disease severity. A 5-day course might suffice for a 4-year-old with mild symptoms, but it is a disservice to an 18-month-old with bilateral AOM and high fever, who demonstrably benefits from a longer course.

Clinicians must resist the urge to adopt a 'one-size-fits-all' mentality. Guidelines exist for a reason: they stratify risk. Adhering to the recommended 10-day course for younger children or those with severe presentations is not antibiotic overuse; it is appropriate care based on evidence of higher failure rates with shorter regimens in these vulnerable groups. The immediate goal is to resolve the child's infection effectively, thereby preventing complications and reducing the need for subsequent, potentially broader-spectrum, antibiotic courses.

The industry, particularly diagnostic developers, has a role to play here. Rapid, accurate diagnostics that can differentiate bacterial from viral AOM, or even identify specific bacterial pathogens and their susceptibility profiles, could revolutionise prescribing. This would allow for truly personalised antibiotic durations, moving beyond empirical choices. Until then, the onus remains on the prescriber to weigh the individual patient's needs against the population-level concern of resistance, making informed decisions that prioritise efficacy where it matters most.

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