



Comparing Narrow- vs. Broad-Spectrum Antibiotics for Common Infections in Children

The choice of antibiotic to treat acute bacterial upper respiratory tract infections in children can affect both symptom resolution and the risk of side effects such as diarrhea and vomiting.

The findings of a recent PCORI-funded study published in *JAMA* can help clinicians treating children for acute respiratory tract infections (ARTIs)—including acute otitis media, Group A streptococcal pharyngitis, and acute sinusitis—make decisions with parents about the medicine that is best for the child. The study, led by Jeffrey Gerber, a pediatrician and researcher at the Children’s Hospital of Philadelphia, included 30,086 children ages 6 months to 12 years taking narrow- and broad-spectrum antibiotics to treat ARTIs.



THE FINDINGS

A PCORI-funded study published in *JAMA*¹ found that narrow-spectrum antibiotics such as amoxicillin are just as effective as broad-spectrum alternatives for treating acute respiratory tract infections (ARTIs) in children ages 6 months to 12 years but have a lower risk of side effects.

What the Study Found

- **Symptom resolution:** At 72 hours after diagnosis, the rate of symptom resolution was no different between children taking narrow- or broad-spectrum antibiotics.
- **Treatment failure rates:** The rate of treatment failure was no different between children taking narrow- or broad-spectrum antibiotics.
- **Side effects:** The risk of side effects, including diarrhea, candidiasis, allergic reaction, and vomiting, was significantly lower for children taking narrow-spectrum antibiotics compared with children taking broad-spectrum antibiotics.

READ MORE ABOUT THIS STUDY AT: www.pcori.org/Gerber094

PROFESSIONAL GUIDELINES

The American Academy of Pediatrics (AAP)² and the Infectious Diseases Society of America (IDSA)³ provide guidelines regarding the treatment of ARTIs.

Acute Otitis Media or Strep Throat Infection:

Both groups recommend the narrow-spectrum amoxicillin as a first-line treatment for most patients with acute otitis media or strep throat infection.

Acute Sinusitis:

The groups have different recommendations for acute sinusitis. AAP recommends amoxicillin, while IDSA recommends the broad-spectrum amoxicillin-clavulanate because of reports of children with ARTIs having coinfection with β -lactamase-producing *H. influenzae*. The presence of these bacteria renders amoxicillin ineffective, resulting in treatment failure.

SOURCES

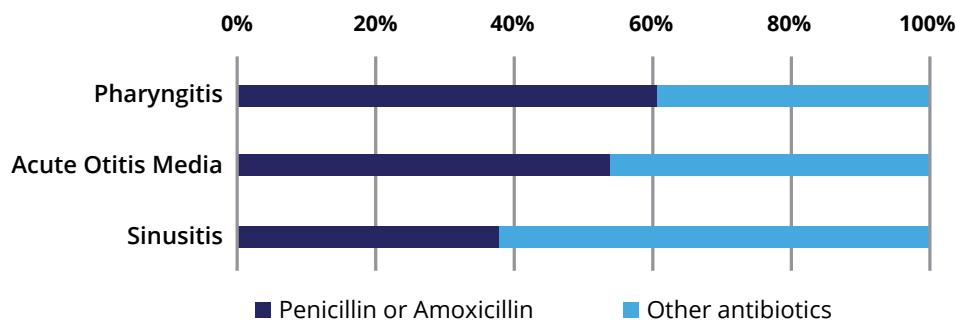
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4. Hersh AL, Fleming-Dutra KE, Shapiro DJ, et al. Frequency of First-line Antibiotic Selection Among US Ambulatory Care Visits for Otitis Media, Sinusitis, and Pharyngitis. *JAMA Internal Medicine*. 2016;176(12):1870-1872.

Prescribing Patterns for ARTIs

With growing awareness of the importance of the responsible use of antibiotics, unnecessary antibiotic use has declined in recent years. However, the choice between narrow- and broad-spectrum antibiotics has not received the same attention.

Clinicians prescribe narrow-spectrum antibiotics in only about half of antibiotic-treated ARTI cases. In a 2016 study of more than 3,000 pediatric patients who were treated with antibiotics for ARTIs, clinicians prescribed penicillin or amoxicillin for 60% of strep throat infections, 54% of acute otitis media, and 39% of acute sinusitis infection cases.⁴ The remaining cases were treated with other antibiotics such as amoxicillin-clavulanate, macrolides, or broad cephalosporins. The two valid reasons for using a broad- versus narrow-spectrum antibiotic—allergic reaction to amoxicillin or history of treatment failure with amoxicillin—should account for no more than 20 percent of broad-spectrum antibiotic use.⁴

Antibiotic Treatments for Pediatric ARTIs, by Antibiotic Type, 2010–2011



Source: Hersh et al., 2016.

Communicating with Parents about Antibiotic Choice

A patient version of this evidence update is available at: www.pcori.org/new-evidence-antibiotics. This handout, along with your discussion, can help parents understand why you may be prescribing an alternative to a familiar antibiotic, such as Augmentin or a Z-pak®. Points include:

- In the Gerber study, narrow-spectrum antibiotics were just as effective as other antibiotics to relieve symptoms.
- Other antibiotics are not necessarily “stronger” than amoxicillin.
- Broad-spectrum antibiotics kill more types of bacteria, including “good” bacteria that help with digestion, leading to a greater risk of diarrhea and vomiting.
- Using broad-spectrum antibiotics when they are not needed increases the likelihood of antibiotic resistance, which may limit the use of these medicines in the future.

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