Comparing Broad- and Narrow-Spectrum Antibiotics for Children with Ear, Sinus, and Throat Infections

Principal investigator
Jeffrey Gerber, MD, PhD

Organization
Children's Hospital of Philadelphia

What was the research about?
Antibiotics are the most common prescription medicines given to children. Some antibiotics are narrow spectrum and some are broad spectrum. Narrow-spectrum antibiotics, like amoxicillin, kill only a few types of bacteria. Broad-spectrum antibiotics, like amoxicillin-clavulanate (Augmentin®, Augmentin® XR, and Augmentin® ES-600), kill many types of bacteria. Both types work well to treat infections. But using broad-spectrum antibiotics when you don't need them can create antibiotic-resistant bacteria that are hard to treat.

In this study, the research team compared narrow-spectrum and broad-spectrum antibiotics to treat children's ear, sinus, and throat infections. The team wanted to know which type of antibiotic

• Was better at helping children recover from ear, sinus, and throat infections
• Would help children have a better quality of life
• Would cause fewer side effects

What were the results?
• Quality of life. Compared with children who took broad-spectrum antibiotics, those who took narrow-spectrum antibiotics reported a better quality of life, although the difference between the groups was small.

• Side effects. Children who took narrow-spectrum antibiotics had fewer side effects, such as diarrhea, than those who took broad-spectrum antibiotics.

• Symptoms that last for more than three days after starting antibiotics. Children who took both types of antibiotics had the same chances of feeling sick after three days.

• Missing school or parents' needing to provide childcare. The number of children who missed school or parents who needed to provide childcare was similar for children who took both types of antibiotics.

Who was in the study?
The study included 2,472 children ages 6 months to 12 years old. Each child had an ear, sinus, or throat infection and took an antibiotic to treat it. The children were patients at 1 of 31 children's clinics in Pennsylvania or New Jersey.

What did the research team do?
At the start of the study, the research team interviewed 109 parents and 24 children. The team asked parents and children about treatment results that were important to them. Parents named four results. These results were poor sleep, missed school or parents' missed work, taking a long time to feel better, and parents' needing to provide childcare. These interviews informed the questions the team asked in the second part of the study.
Next, the research team identified children who had taken either narrow-spectrum or broad-spectrum antibiotics for ear, sinus, or throat infections. The team asked the parents and children about

- Children’s quality of life
- Children’s side effects and how long symptoms lasted
- Children missing school or parents missing work
- Parents’ needing to provide childcare while the child was sick

**What were the limits of the study?**
Some of the children in the study had viral infections instead of bacterial infections. Because antibiotics don’t work against viral infections, the results may change. Also, the research team called many parents and children, but only about 30 percent answered the phone. The team found that the people who answered their questions did not represent all children who were sick (for example, children of different ages, genders, or races). So, the results may not apply to all children.

Future research could compare narrow-spectrum and broad-spectrum antibiotics in children of different ages, genders, and races. Researchers could also study the two types of antibiotics in children with confirmed bacterial infections.

**How can people use the results?**
Doctors and parents can use these results to make decisions about the type of antibiotic to use. Narrow-spectrum antibiotics appear to work just as well as broad-spectrum antibiotics to treat most ear, sinus, and throat infections in children. Narrow-spectrum antibiotics lead to fewer side effects.

*To learn more about this project, visit pcori.org/Gerber094.*