

Study looks at antibiotic choice for treating childhood pneumonia

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New Vanderbilt-led research shows hospitals are doing a better job of using antibiotics less commonly associated with antibiotic resistance to treat children hospitalized with community-acquired pneumonia (CAP).

The report, 'Antibiotic choice for [children](#) hospitalized with [pneumonia](#) and adherence to national guidelines,' was released today in the journal *Pediatrics*.

This study was nested within a larger study, the Centers for Disease Control and Prevention (CDC) Etiology of Pneumonia in the Community (EPIC). The multi-center EPIC study was a prospective, population-based study of community-acquired pneumonia hospitalizations among children in the United States that sought to address critical gaps in the knowledge about pneumonia.

Study authors examined the impact and implementation of the new national guidelines that call for prescribing penicillin or ampicillin, known as narrow-spectrum antibiotics, to treat most children hospitalized with pneumonia. The guidelines were published in 2011 by the Pediatric Infectious Disease Society and the Infectious Diseases Society of America.

Prior to the new prescribing guidelines, third-generation cephalosporins, a broader-spectrum class of antibiotics, were commonly used. Results showed that after the release of the guidelines, hospitals were less likely to prescribe third-generation cephalosporins, using it about 44.8 percent of the time by the end of the study compared with 57.3 percent use expected from pre-guidelines trends. After the guidelines release, the use of narrow-spectrum antibiotics increased from 3.9 percent to 15.2 percent.

'Third-generation cephalosporins are broader-spectrum antibiotics (compared to ampicillin) and are unnecessary for the treatment of

uncomplicated pneumonia in children. Their use contributes to [antibiotic resistance](#), a major public health problem, both nationally and globally,' said study lead-author Derek Williams, M.D., MPH, assistant professor of pediatrics, and member of the Vanderbilt Vaccine Research Program and the Division of Hospital Medicine.'

'Our group has previously shown that treatment with either narrow- or broad-spectrum antibiotics attained similar clinical outcomes and incurred similar costs for the vast majority of children hospitalized with pneumonia. The recent national guidelines recommend ampicillin for most cases of pneumonia, but the impact of this recommendation is unclear, and the influence of local dissemination efforts on antibiotic selection for pneumonia in children has not previously been examined.'

'The objective evaluation of the impact of new guidelines or policies is necessary to assess whether the desired objectives are achieved and to inform potential adjustments for those initiatives,' added Carlos G. Grijalva, M.D., MPH, senior author of the study and associate professor in the Department of Health Policy.

From January 2010 to June 2012, children who were admitted with pneumonia at Monroe Carell Jr. Children's Hospital at Vanderbilt, LeBonheur Children's Medical Center and the University of Utah were recruited for the EPIC study. Researchers enrolled 2,638 children younger than 18, but for the current study 507 children who did not receive antibiotics or were younger than 3 months of age were excluded. The final study population included 2,121 children.

Following the new prescribing guidelines, two of the three hospitals in the study implemented active dissemination efforts targeting the new recommendations, while the third hospital had no formal efforts to distribute the guidelines. By the end of the study, only the two hospitals that actively

disseminated the guidelines showed statistically significant declines in cephalosporin use.

'We conclude that local dissemination efforts played a critical role in the adoption of the new national [guidelines](#),' summarized Williams.

Pneumonia is a leading cause of hospitalization among young children, and the burden of pneumonia-related hospitalization is highest among children younger than 5. In the U.S., the yearly costs associated with pneumonia in children are estimated at \$1 billion. Vanderbilt researchers have been working to better understand the causes and effects of as well as treatments for pneumonia.

As a follow-up to this project, the researchers are currently studying changes in antibiotic prescribing at more than 30 children's hospitals to more precisely identify determinants of antibiotic selection and uptake of evidence-based practice change at the local level.

Provided by Vanderbilt University Medical Center

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