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Respiratory viruses most common cause of pneumonia in children, study finds

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Respiratory viruses, not bacterial infections, are the most commonly detected causes of community-acquired pneumonia in children, according to new research released Feb. 26 in the *New England Journal of Medicine*.

The multicenter Etiology of Pneumonia in the Community (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. The study showed that the burden of pneumonia-related hospitalization is highest among children younger than 5 years of age.

Researchers' key findings revealed that 81 percent of cases examined were caused by viral infections, while only 8 percent were caused by bacterial infections and 7 percent were both viral and bacterial. That knowledge could be a catalyst for researchers to further investigate new and better ways to treat or prevent respiratory viruses, such as respiratory syncytial virus (RSV), which can lead to pneumonia.

"What this tells us is that viruses are important causes of pneumonia. But it also tells us that with the routinely administered pneumococcal and haemophilus vaccines given to children, that we have virtually eliminated most bacteria as causes of pneumonia." said Kathryn Edwards, M.D., study co-author, professor of Pediatrics, director of the Vanderbilt Vaccine Research Program, and the Sarah H. Sell and Cornelius Vanderbilt Chair.

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 University of Utah were recruited for the study. A total of 2,638 children younger than 18 were enrolled, with 2,358 of those children having pneumonia confirmed by chest X-ray. The study at Vanderbilt was led by Edwards and Derek Williams, M.D., MPH, assistant professor of Pediatrics and member of the Vanderbilt Vaccine Research Program and the Division of Hospital Medicine.

"Pneumonia is a leading cause of hospitalization and is nearly always treated with antibiotics, but results from the EPIC study indicate we could drastically reduce antibiotic use overall, and when we do use antibiotics, we could do a much better job of limiting the use of broad-spectrum antibiotics," Williams said. "Unfortunately, differentiating viral from bacterial causes of pneumonia is not always clear. We are now trying to unravel that mystery to better understand the best way to treat pneumonia, when to use antibiotics, what antibiotics to use, and how to prevent it."

Participant demographics in the total enrolled population showed 45 percent were girls; 40 percent were white, 33 percent were black, 19 percent were Hispanic and 8 percent were another race or ethnic group. Of the children, 51 percent had an underlying health condition. The median age of children was 2. About 21 percent of children had to be admitted to the intensive care unit, and three children died.

Williams explained that nasal, throat and blood samples were obtained on all the children to unravel the cause of pneumonia, whether viral or bacterial. RSV and human rhinovirus accounted for the leading viral causes of pneumonia in these children, followed by human metapneumovirus (HMPV), adenovirus, parainfluenza virus and coronavirus, according to the study.

The yearly costs of pneumonia among children in the U.S. are estimated at $1 billion. Researchers have been working to better understand the causes, effects and treatments of pneumonia.

The study authors wrote, "Effective antiviral vaccines or treatments, particularly for RSV infection, could have a mitigating effect on pneumonia in children."

Provided by Vanderbilt University Medical Center