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Increase in Hemolytic Uremic Syndrome Caused by Pneumococcal Bacteria *Causes of Childhood HUS Have Shifted Since Pneumococcal Vaccine Was Introduced*

Philadelphia, Pa. (August 3, 2010) - Introduction of the PCV-7 vaccine to prevent invasive pneumococcal disease (IPD) has led to a shift in the types of bacteria causing hemolytic uremic syndrome (HUS)—an important cause of acute kidney failure in children, reports a study in the August issue of *The Pediatric Infectious Disease Journal*. The journal is published by Lippincott Williams & Wilkins, a part of Wolters Kluwer Health, a leading provider of information and business intelligence for students, professionals, and institutions in medicine, nursing, allied health, and pharmacy.

Very rare a decade ago, HUS related to *Streptococcus pneumoniae* bacteria (SP-HUS) now occurs in more than five percent of children with IPD. When SP-HUS does develop, it is generally caused by bacterial strains not covered by the PCV-7 vaccine, according to the new study.

Vaccine Has Led to Changing Patterns of HUS

Led by Dr Jeffrey M. Bender of University of Utah, Salt Lake City, the researchers reviewed separate databases of children treated for HUS and IPD in Utah. Hemolytic uremic syndrome is a disease causing destruction of red blood cells that can lead to sudden (acute) kidney failure. Although it most commonly occurs as a reaction to childhood infections (such as with *E. coli* bacteria) causing diarrhea, HUS can result from other infections as well. Invasive pneumococcal disease refers to serious infections—such as pneumonia, bloodstream infection, or meningitis—caused by SP bacteria.

Of 460 children with HUS identified from 1971 to 2008, only 1.5 percent had HUS caused by SP. Similarly, of 435 children with IPD between 1997 and 2008, only 1.6 percent developed HUS.

However, the percentage of HUS cases caused by SP increased significantly after 2000—the year that vaccination with PCV-7 was introduced. Before 2000, only 0.3 percent of children with IPD developed HUS. After 2000, that figure jumped to 5.6 percent.

Fewer IPD Cases, But Greater Risk of Developing HUS

The PCV-7 vaccine—which protects against seven key strains of SP bacteria—has been highly effective in reducing the number of children with IPD. In recent years, most cases of SP-HUS have been caused types of SP that are not prevented by the PCV-7 vaccine—particularly a strain called serotype 3. Thus, while the number of children with IPD has decreased, there has been an increase in the percentage of cases caused by SP strains not "covered" by PCV-7.

Most cases of SP-HUS were related to pneumonia or empyema (infection of the pleural tissues around the lungs). They also appeared more severe than HUS caused by other infections. Children with SP-HUS stayed in the hospital longer, spent more time in the ICU, and spent more time on mechanical ventilation than those with other causes of HUS.

"We identified an increasing incidence of SP-HUS in Utah children," Dr. Bender and colleagues write. They urge doctors to be aware that, although IPD is less common than it was ten years ago, children who do have IPD are now more likely to develop HUS and acute kidney failure. Risk seems especially high in IPD cases with pneumonia or empyema.

The researchers highlight the role of SP serotype 3 in causing HUS—although they note that different strains may be more important in other regions. The U.S. Food and Drug Administration is currently considering a new "PCV-13" vaccine, which would help to prevent infection with serotype 3 and other strains. "Once licensed, use of the PCV-13 may decrease the rates of empyema and SP-HUS in Utah and other regions with similar epidemiology," Dr. Bender and co-authors conclude.

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