Serotype Surge Follows PCV7 Success in Alaska

BY MARY ANN MOON
Contributing Writer

The phenomenal success of the PCV7 vaccine in Alaska Native children has been blunted by a dramatic rise in infections with "replacement" pneumococcal organisms—that is, serotypes that weren't covered by the vaccine—investigators reported.

The pneumococcal 7-valent conjugate vaccine (PCV7) has virtually eliminated invasive pneumococcal disease caused by the seven covered serotypes in Alaska Native children, a particularly susceptible group whose rate of the disease had been triple that of the general U.S. population.

It was introduced into the routine childhood vaccine schedule for Alaskan children in 2001.

However, between the periods 2001-2003 and 2004-2006, the rate of non–PCV 7 serotype disease has more than doubled in these children and has increased in Alaska Native adults as well, wrote Dr. Rosalyn J. Singleton of the Centers for Disease Control and Prevention's Arctic Investigations Program, Anchorage, and associates.

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In an editorial comment accompanying this report, Dr. Timothy R. Peters and Dr. Katherine A. Poehling said that the experience in this subpopulation of American children may be "an early manifestation of a changing pneumococcal epidemiology that is occurring much more widely."

"The findings of [Singleton and her associates] reinforce the widely held expert opinion that pneumococcal serotype replacement will ultimately erode PCV7 effectiveness in all vaccinated populations," Dr. Peters and Dr. Poehling commented.

"Continued serotype replacement may necessitate revision or expansion of protein-conjugate vaccines every 5-10 years, until successful development of a vaccine that provides immunity to all pneumococcal serotypes," wrote the editorialists, both of Brenner Children's Hospital at Wake Forest University, Winston-Salem, N.C.

Dr. Singleton and her associates assessed vaccination status and rates of invasive pneumococcal disease in Alaska from 1995 through 2006.

Documented vaccine coverage among Alaska Native children was an extremely high 96%.

Rates of invasive pneumococcal disease had decreased dramatically following the introduction of the vaccine, but began rising again during the 2004-2006 period among Alaska Native children and hit a plateau among non-Native children. This effect was the result of a marked decrease in disease caused by covered serotypes and a subsequent marked increase in disease caused by uncovered serotypes.

In particular, the rate of non-PCV 7–type invasive disease rose 130% between 2001-2003 and 2004-2006 among Alaska Native children younger than age 2 years (JAMA 2007;297:1784-92).

The proportion of invasive pneumococcal disease cases in children younger than 5 years who required hospitalization increased from 39% in 1995-2000 to 62% in 2004-2006, the proportion that presented with empyema rose from 2% to 13%, and the proportion that developed both pneumonia and bacteremia increased from 40% to 57%.

The proportion of cases with meningitis did not change over time.

In their editorial comment, Dr. Peters and Dr. Poehling said that this study is the first to demonstrate that pneumococcal serotype replacement has resulted in increased rates of invasive disease in a group of American children (JAMA 2007; 297:1825-6).

In this and other studies, one particular serotype that isn't covered by the PCV7 vaccine—19A—has been implicated in a substantial proportion of cases of invasive pneumococcal disease.

A 13-valent pneumococcal conjugate vaccine that includes serotype 19A is currently in phase III clinical trials, Dr. Peters and Dr. Poehling noted. ■