

Study recalculates costs of combination vaccines

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One of the most popular vaccine brands for children may not be the most cost-effective choice. And doctors may be overlooking some cost factors when choosing vaccines, driving the market toward what is actually a more expensive option, according to a new study by University of Illinois researchers.

"The choice of vaccines to administer can be driven by numerous factors," says Sheldon H. Jacobson, a co-author of the study and a professor of computer science and of mathematics at the U. of I. "In an environment where vaccines are under growing public scrutiny, no stone should be left unturned in uncovering why one combination vaccine is preferred over another. Such analyses provide information that serve to better inform and advise all stakeholders."

Only two vaccines are available now that immunize against five diseases with a single injection: Pediarix and Pentacel. Both are administered in three doses, and both immunize against polio, diphtheria, tetanus and pertussis. However, Pediarix immunizes against hepatitis B (HepB) while Pentacel immunizes against *Haemophilus influenzae* type B (Hib). One or the other – but not both – can be used as the backbone for the Recommended Childhood Immunization Schedule stipulated by the Centers for Disease Control and Prevention. Children also must receive either the HepB or Hib shot, depending on which one is missing from their combination vaccine.

"The market will gravitate toward the combination vaccine that provides

the best value," said graduate student Banafsheh Behzad, the first author of the study. "From the perspective of a [health care](#) provider, the important question to ask is: Which combination vaccine should be used to attain the minimum overall cost, given a fixed cost of an injection?"

In a previous analysis, the researchers found that Pediarix is the most cost-effective combination vaccine. Yet in the public sector, Pentacel's sales have been significantly higher. The new study explores whether other factors may be influencing this market response.

The researchers found two complicating factors in HepB and Hib immunizations that can affect health care providers' decisions when comparing combination vaccines. Infants in the United States are given a dose of HepB vaccine at birth, so only two more doses are required. Therefore, children who receive three doses of Pediarix get "extra-immunized" against HepB. However, if the Merck Hib vaccine is used, one less dose is required, so children who receive Pentacel may be extra-immunized against Hib.

"Our analysis suggests that the relative uptake of the two combination vaccines Pediarix and Pentacel can be explained by [health care providers](#) either recognizing the birth dose of Hepatitis B (and hence, choosing to administer Pediarix) or ignoring the Merck Effect for Haemophilus Influenza Type B (and hence, choosing to administer Pentacel)," Behzad said.

When the costs of extra immunizations are added to the costs of the combination vaccines, Pediarix ultimately is the lower cost. The prevalence of Pentacel, however, implies that pediatricians recognize the value of the birth dose of the hepatitis B vaccine, but that they do not take into account the cost savings of administering fewer doses of the Merck Hib vaccine.

The researchers encourage physicians and advisory boards to take all factors into account when determining how to administer the best combination of vaccines for the lowest cost.

"Vaccines do not exist in an immunization vacuum," Jacobson said. "The decision to use one particular vaccine may have implications on the choice of other vaccines, even when the diseases that they cover are distinct or only partially overlapping."

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More information: The paper, "The Relationship Between Pediatric Combination Vaccines and Market Effects," is available online: [ajph.aphapublications.org/doi/ ... 105/AJPH.2013.301780](http://ajph.aphapublications.org/doi/.../105/AJPH.2013.301780)

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