Mistimed Vaccines Add to Suboptimal Coverage

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Compliance with immunization recommendations goes beyond missed doses: Administration of vaccines before the recommended age and/or too close together may add to suboptimal coverage, according to data analysis by scientists from the Centers for Disease Control and Prevention in Atlanta.

Elizabeth T. Luman, Ph.D., and her associates conducted a nationally representative study of compliance with Advisory Committee on Immunization Practices (ACIP) vaccine recommendations (Am. J. Prev. Med. 2008;34:463-70).

"We knew that about one in five toddlers [was] missing a vaccination, but we were surprised that mistimed doses reduced coverage by another 10%," Dr. Luman said in an interview. "In total, about one in four children aged 19-35 months [is] not current" on vaccinations.

Dr. Luman and her associates at the CDC's National Center for Immunization and Respiratory Diseases assessed 17,563 children aged 19-35 months. They used 2005 vaccination histories from the National Immunization Survey (NIS).

The estimated coverage with the 4:3:1:3:3 vaccination series incorporating all ACIP recommendations was 72%.

This is 9 percentage points lower than calculations based only on counting doses. Compliance was lowest with the DTaP and greatest with the poliovirus vaccine.

"It's important that children get all the recommended doses, but timing is important as well, so vaccines will be most effective," said Dr. Luman. She and her associates stated that they had no relevant financial disclosures.

"The implication of this particular article is that if you did not vaccinate at the appropriate time, you're vulnerable to a particular disease," Dr. John Bradley said in an interview. "We want people to get the vaccine in the recommended time slot if possible, but that is not to say that if you have to reschedule the appointment … that you are completely susceptible to that disease." Dr. Bradley is a member of the American Academy of Pediatrics Committee on Infectious Diseases. The ACIP recommendations are developed in collaboration with the AAP and the American Academy of Family Physicians.

The researchers recognized that sometimes a vaccine cannot be given at the recommended time. "Administering a vaccination a few days early is preferred to missing the opportunity to vaccinate a child who is unlikely to return at the appropriate time," the authors wrote. "However, the observance of both age-appropriate vaccination and sufficient time between doses in a series maximizes the immune response and the vaccine's efficacy."

"Medical science doesn't know how much wiggle room we have. To give a week early or late—those studies have not been done," said Dr. Bradley, who is also director of the division of infectious diseases at Children's Hospital and Health Center, San Diego.

"The timing of vaccines and boosters is based on a best guess of optimal timing" based on large-scale trials reviewed by the Food and Drug Administration. Dr. Bradley said he has no financial disclosures related to vaccines.

About 6% of children received at least one age-invalid vaccination in the 4:3:1:3:3 series.

Another 3% received at least one interval-invalid vaccination; this figure included 0.3% who received MMR immunization too soon following a varicella vaccination.

In addition, approximately 14% of children had a third dose of hepatitis B vaccine prior to the age of 6 months, the minimum valid age.

Limitations of the study include vaccination histories reported by vaccine providers identified through parents, as well as a lack of information regarding vaccine contraindications, including allergic reactions.

"Health care providers, along with parents and vaccination programs, have done an outstanding job of increasing vaccination levels in the U.S.," Dr. Luman commented. "But continued vigilance and improvements are needed to make sure that every child and every community [is] protected from these deadly diseases. Good communication between providers and parents can help increase parental awareness of the benefits of vaccination, and ensure that children are brought in for all their vaccinations at the right time." ■