



Safety of Vaccines During the First Year of Life

Key Points:

- The timing of various vaccine doses has been designed and studied to optimize the immune response and ensure protection when a child is at greatest risk.
- Delaying or omitting vaccines leaves children unprotected and at risk.
- Despite an increased number of recommended childhood vaccines, the number of antigens in vaccines has decreased significantly.
- A study comparing innate and adaptive immune responses after nonspecific immune stimuli between vaccinated and unvaccinated children showed similar robust immune responses.
- Studies have shown that early childhood vaccination does not negatively impact a child's ability to respond to non-vaccine-targeted infections.
- The number of vaccines and timeliness of vaccination early in life has not been associated with adverse neuropsychiatric outcomes later in childhood.

The American Academy of Pediatrics (AAP) recommended vaccine schedule is safe and optimizes immune response and protection.^{1,2}

- The vaccines in the AAP schedule have been extensively studied and found to be safe and effective. There is a robust monitoring system to ensure potential rare side effects are identified and evaluated.
- The US vaccine schedule is designed for US children and based on disease patterns and the health system in the US.
- The timing of various vaccine doses has been designed and studied to optimize the immune response and ensure protection when a child is at greatest risk.
- **Delaying or omitting vaccines leaves a child unprotected at a time when they are at greatest risk.**

Number of antigens in vaccines has decreased over time^{3,4}

- Despite the increase in the number of vaccines included in the childhood vaccine schedule over the past decades, the actual number of antigens has decreased significantly.
- The cumulative antigen exposure by 24 months of age from the standard vaccine schedule in the **1990s was approximately 10,000 antigens.**
- **By 2012**, the cumulative antigen exposure by 24 months of age from the standard vaccine schedule was **approximately 315 antigens.**
- This decrease was primarily due to the change from the whole-cell pertussis vaccine (3,000 antigens) to the acellular pertussis vaccine (2-4 antigens).



- Advances in vaccine technology have allowed the development of effective vaccines using fewer antigens.

Early childhood immunizations do not weaken the immune system

- In a study of 805,206 children in Denmark born between 1990 and 2001, there was no association between increased number of vaccinations and hospitalization for non-vaccine-targeted infections.⁵
- A nested case-control study that included 944 children from six US healthcare organizations found that the cumulative antigen exposure in the first 24 months of life was not associated with hospitalization with non-vaccine-targeted infections.⁴
- A small study that compared the innate and adaptive immune responses to nonantigen-specific stimuli in completely vaccinated and completely unvaccinated children 3-5 years of age found similar robust immune responses in both groups of children.⁶

Early childhood vaccines are not associated with adverse neuropsychological outcomes

- Two studies using the publicly available data of 1047 children from a previous Vaccine Safety Datalink study of thimerosal exposure and 42 neuropsychological outcomes evaluated vaccination during the first 24 months of life and neuropsychological outcomes at 7-10 years of age.^{3,7,8}
- The first study evaluated the association between total vaccine antigens at 7, 12, and 24 months and neuropsychological outcomes.³
- **There were no adverse associations between the number of antigens received through vaccines in the first two years of life and neuropsychological outcomes in later childhood.**
- The goal of the second study was to determine whether children who received recommended vaccines on time during the first year of life had different neuropsychological outcomes at 7-10 years of age as compared with children with delayed receipt or nonreceipt of these vaccines.⁷
- No statistically significant differences favored delayed receipt of vaccination or the less vaccinated children.
- **There was no adverse effect on neuropsychological outcomes at 7-10 years of age for children receiving timely vaccination during infancy compared to delayed vaccination or less vaccinated children.**

The information contained herein should not be used as a substitute for a physician's independent judgement as to appropriate medical care and treatment. There may be variations in treatment that are recommended based on individual facts and circumstances.



References

1. [AAP's 2026 immunization schedule keeps routine recommendations intact after overhaul of federal schedule | AAP News | American Academy of Pediatrics](#)
2. [What is the difference between the AAP immunization recommendations and other vaccine schedules? - HealthyChildren.org](#)
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