



COMMENTARY

Adhering to vaccine schedule is best way to protect children from disease

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Dr. Fisher

Vaccination rates are at a record high level, and rates of almost every vaccine-preventable disease continue to drop. Now that we are seeing fewer infections, however, we are beginning to encounter more hesitancy in vaccine acceptance. Parents are asking: Why is the vaccine schedule one size fits all, why so many vaccines, why start so early, why not spread out the schedule?

Following is information regarding the development of the vaccine schedule and the rationale behind it.



Dr. Bocchini

The vaccine schedule is published yearly in January; on occasion, the schedule has been updated during the year. These schedules are developed by the Advisory Committee on Immunization Practices of the Centers for Disease Control and Prevention with input from the AAP Committee on Infectious Diseases and the American Academy of Family Physicians (see sidebar).

The vaccine schedule undergoes vigorous scientific and evidence-based review each year. The schedule is designed to protect children from vaccine-preventable diseases as soon as possible and is appropriate for the majority of children.

Why is the schedule one size fits all?

Decisions regarding an individual child's immunizations are not one size fits all.

Exceptions to the schedule are made when there is a reason to delay or omit a vaccine. Contraindications and precautions are taken into account for each vaccine in the series and at the time of each dose. Additional vaccine strategies are utilized in patients with special clinical circumstances, such as immunocompromised children and those with chronic diseases. Furthermore, the schedule is adjusted for situations such as planned international travel and for catch-up.

Why so many vaccines?

To us, this is part of the good news. Now, we can prevent 16 serious illnesses and their consequences in girls and 15 in boys through routinely recommended immunizations. Making it possible for their children to receive vaccines is one of the important ways

parents can keep their children healthy.

In fact, we look forward to when we will have vaccines to prevent or modify infections due to respiratory syncytial virus, *Staphylococcus aureus*, *Streptococcus pyogenes* and other agents.

Why do some vaccines require multiple doses?

Immunity following a single dose of some vaccines is either incomplete or short-lived. Using a series of doses improves the percentage of patients who develop immunity and the duration of such immunity. These vaccines also require booster doses to maintain long-term protection.

Some people are concerned that giving a number of vaccines at the same time may not be safe. However, prior to vaccine licensure, the Food and Drug Administration requires studies to evaluate the safety and response to the new vaccine when the other vaccines recommended for that age are given at the same visit. The studies also must evaluate whether the new vaccine alters the response to the other vaccines. This information is reviewed carefully before decisions are made about adding a vaccine to the schedule.

Why start so early?

The decision as to when to give a vaccine is based on the epidemiology of the vaccine preventable disease. Often, these diseases are more severe in younger children. Therefore, we start early to ensure that the youngest and often most fragile are protected as soon as possible.

For example, most deaths due to pertussis occur in infants younger than 6 months of age. The peak incidence of meningitis due to *Haemophilus influenzae* type b before the introduction of conjugate vaccine was approximately 9 months of age.

Prior to birth, a baby receives antibodies from the mother. These maternal antibodies provide protection against many of the previously "usual childhood infections" such as measles, mumps and chickenpox, and bacteria such as *H. influenzae* and *Streptococcus pneumoniae*. The levels of these antibodies decrease with each month of age so that by 6 months, protection is minimal. The vaccine schedule ensures that while the levels of maternal antibody are falling, infants are developing their own antibodies due to immunizations.

The goal is to protect the infant as soon as possible; the current schedule has essentially eliminated *Haemophilus* and greatly decreased the incidence of invasive pneumococcal disease.

For measles, mumps, rubella and varicella, we wait until all maternal

antibody is gone so that these live vaccines are not inactivated by residual maternal antibody. Because of the success of vaccines, the incidence of these viral infections is quite low so there is little risk of infection in the first year of life. However, if vaccination rates fall and measles outbreaks increase as they have this past year in the United States, we will begin to see more cases of measles not only in children whose parents refuse vaccination but also in children too young to receive the vaccine.

Why not spread out the schedule?

Spreading out the schedule would leave a child unprotected. Furthermore, there is no reason to expect that spreading out the schedule would decrease adverse events.

Spreading out the schedule also would increase the number of visits to a physician and would increase the number of visits that require an immunization. Such a schedule would increase the number of unprotected children in the population, which would decrease the benefits of herd immunity. Since there is no advantage but several disadvantages, there is no logic to spreading out the schedule.

Parents who are considering delaying their child's immunizations need to be made aware that they are putting their child at risk.

Although the incidence of most vaccine-preventable diseases in the United States is very low, they are low because the majority of U.S. children are immunized. As a result, the circulation of many of these organisms has been interrupted. However, these pathogens can be reintroduced easily into a population as a result of today's mobile society. If enough children are not immunized, we will see outbreaks of these vaccine-preventable diseases.

In areas of Great Britain where measles immunization rates have decreased, outbreaks are occurring, prompting mass immunization campaigns. Similarly, pertussis outbreaks occurred within a few years in countries where pertussis immunization was discontinued.

Immunizations have been a major public health success story. The vaccine schedule has evolved over the past 50 years based on scientific evidence. Following this schedule is the best way to protect your patients from these diseases. Please continue to encourage your families to have their children immunized on time; children are our future, and it is our job to protect them.

Dr. Fisher is chair of the AAP Section on Infectious Diseases executive committee. Dr. Bocchini is chair of the AAP Committee on Infectious Diseases.

Agencies collaborate on vaccine schedules

Many experts are involved in the development of the vaccine schedules.

The Advisory Committee on Immunization Practices (ACIP) is made up of 15 members who include experts in infectious diseases and public health and a consumer representative. In addition, ex-officio representatives from national and international medical, infectious disease, public health, nursing and pharmacist organizations as well as governmental agencies participate in deliberations and provide input to ACIP. The Academy is represented by two members of the Committee

on Infectious Diseases (COID).

COID consists of 12 pediatric infectious disease experts appointed to serve two-year terms, a representative of the AAP Section on Infectious Diseases, several consultants who are pediatric infectious disease experts, and liaisons from the Centers for Disease Control and Prevention, American Academy of Family Physicians, Canadian Pediatric Society, National Institutes of Health, Food and Drug Administration and the American Thoracic Society.