



Combination Vaccines

Children in the United States can receive up to 20 vaccinations to protect against 11 diseases in their first 2 years of life. With the current immunization schedule it is possible that a child could receive as many as 5 separate injections during a single office visit.

For that reason—and because more vaccines against fatal diseases are being developed—manufacturers have been developing combination vaccines. With the use of combination vaccines the number of injections can be reduced without reducing the number of diseases against which a child is protected.

A combination vaccine is a vaccine that consists of 2 or more separate immunogens (elements that produce an immune response from the body) physically combined into a single product. Combination vaccines aim to prevent multiple diseases or 1 disease caused by different organisms.

An example of a combination vaccine is the **measles-mumps-rubella (MMR) vaccine**. Other include:

- **Diphtheria-Tetanus-Acellular Pertussis Vaccine (DTaP)**
- Haemophilus b Conjugate Vaccine-Hepatitis B Vaccine
- Hepatitis A Inactivated-Hepatitis B Vaccine
- Measles and Mumps Virus Vaccine
- Diphtheria-Tetanus-Acellular Pertussis-Hepatitis B-Inactivated Poliovirus Vaccine
- **Pneumococcal conjugate vaccine** (contains seven types of the bacterium *Str. Pneumoniae*)

In addition to reducing the number of injections—and therefore the amount of pain the children experience—the use of combination vaccines might:

- Improve the timeliness of vaccination coverage
- Reduce costs associated with stockpiling and administering separate vaccines
- Reduce costs associated with extra health care visits that result from delayed vaccinations
- Facilitate the integration of new vaccines into the childhood immunization schedule.

The **US Food and Drug Administration**, requires that "a biological product may combine two or more safe and effective components...when combining of the active ingredients does not decrease the purity, potency, safety, or effectiveness of any of the individual active components." Thus the evaluation of the safety and efficacy of combined vaccines is a complex process.

Different manufacturers may apply for licensure for combination vaccines that contain different vaccine components—and the components from different manufacturers may differ. Therefore, health care providers must consider how best to use the competing vaccine products.

Each manufacturer develops and produces vaccines by its own methods. In addition, the various manufacturers may make different combinations of vaccines. Because vaccines from different manufacturers are often not tested for their interchangeability, vaccine policy makers must make **recommendations** about how best to utilize the various combination vaccines.

For example, the CDC guidance on the use of combination vaccines is as follows: "A combination vaccine may be used when one or more components are indicated, none of the other components are contraindicated, and if the combination vaccine is approved by FDA or recommended by a national advisory group (such as ACIP) for that dose in the schedule, unless this would lead to a needed vaccine dose being withheld."

Although the development, evaluation, and use of combination vaccines is complex, these types of vaccines should simplify the immunization schedule and reduce the number of injections that children receive.