

Number of Doses in Vaccine Series

Concern: I don't understand why my child needs more than one dose of the same vaccine.

General Responses:

- When you look at the vaccine schedule, it does sometimes seem like a lot doses of the same vaccine.
- The reason for the number of doses needed varies by vaccine.
 - For some vaccines (primarily inactivated vaccines like Hib or PCV13) the first dose does not provide as much immunity (protection) as possible. So, more doses are needed.
 - For vaccine such as DTaP, the initial series of 4 shots (generally received at 2, 4, 6, and 12-18 months) helps build immunity. Getting multiple doses allows the immune response to last longer.
 - After a while the immunity begins to wear off.
 - A *booster* dose is needed to bring immunity levels back up.
 - For some vaccines (primarily live vaccines like MMR or Varicella), studies have shown that more than one dose is needed for everyone to develop the best immune response.
 - The second dose makes sure almost everyone is protected.
 - In the case of the flu vaccine, adults and children (older than age 6 months) need to get a dose every year.
 - An annual flu vaccine is needed because a) the flu disease-causing viruses may be different from the year before and b) immunity from a flu vaccine is thought to last one flu season.

Risk of Disease:

- Vaccine-preventable diseases continue to be a real threat to the health of U.S. residents.
- Vaccines are necessary because none of the diseases that they protect against have been eliminated from the world - all are just a plane trip away.
- Bacteria that cause, for example HIB, Pneumococcal or Meningococcal diseases or viruses that cause Chickenpox, Mumps, Flu or Rotavirus (“gastroenteritis”) are common in the U.S. – they’re just waiting to infect people.
- Because most vaccines take more than one dose to work, if you wait until there is a disease outbreak in your area (school, daycare, office, church, etc.) your child could be infected before there is time for the vaccine doses to be given.
- If not enough dose of vaccines like MMR or DTaP are administered, then your child will be at risk for some very concerning diseases - like measles or pertussis (whooping cough)
 - There were 644 cases of measles reported in the U.S. in 2014 (5 in Michigan).
 - This is more cases than in any year since 1996; only 37 cases in 2004
 - There have been significant increases in measles cases world-wide.
 - Over 50,000 cases reported in the Philippines in 2014.
 - In 2011, 42% of the children younger than age 5 years who got measles in the U.S. were hospitalized.

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- Even with the best of care, 1 to 3 out of 1,000 children who get measles will die from the disease.
- There were 1,301 cases of pertussis disease reported in Michigan in 2014
- CDC estimates over 1 million adolescents and adults have pertussis each year
 - Children, especially those under age 12 months, account for the majority of hospitalizations and deaths from pertussis.

Benefit of Vaccination:

- Vaccines work! Below are some examples.
- MMR vaccine (measles, mumps, rubella)
 - 2-5% of children who receive only 1 dose of MMR vaccine fail to respond to it.
 - Most persons who fail to respond to the 1st dose will respond to a second dose.
 - Studies indicate that more than 99% of persons with 2 doses will develop immunity.
- Chickenpox vaccine
 - 1 dose of varicella is 85% effective in preventing any form of chickenpox and almost 100% effective against severe chickenpox.
 - In pre-licensure studies: 2 doses of varicella are 98% effective at preventing any form of varicella and 100% effective against severe chickenpox.
 - In post-licensure studies: 2 doses of varicella vaccine are 88-98% effective at preventing all chickenpox.
- Rotavirus vaccine
 - Before rotavirus vaccines in the U.S., rotavirus disease caused an estimated 20-60 deaths, 55,000-70,000 hospitalizations, more than 200,000 emergency department visits and more than 400,000 provider visits annually in children less than 5 years of age.
 - Current rotavirus vaccines have been found to be highly protective against rotavirus disease requiring hospitalization (85-90%) and in preventing emergency department care (greater than 80%).
 - Approximately 40,000-50,000 hospitalizations for rotavirus were prevented each year since 2008 in children less than 5 years of age.

Resources for General Responses

Centers for Disease Control (CDC) www.cdc.gov/vaccines

Understanding How Vaccines Work

<http://www.cdc.gov/vaccines/hcp/patient-ed/conversations/downloads/vacsafe-understand-bw-office.pdf>

Some Common Misconceptions about Vaccination and How to Respond to Them

<http://www.cdc.gov/vaccines/vac-gen/6mishome.htm>

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Michigan Department of Community Health (MDCH) www.michigan.gov/immunize

Vaccine Preventable Diseases in Michigan - Annual Summaries (provide rate of disease in MI)
http://www.michigan.gov/mdch/0,4612,7-132-2942_4911_4914_6385-47024--,00.html

Children's Hospital of Philadelphia

Recommended Immunization Schedule - what you should know

<http://vec.chop.edu/export/download/pdfs/articles/vaccine-education-center/recomm-immuniz-sched-eng.pdf>

Facts about Childhood Vaccines

<http://vec.chop.edu/export/download/pdfs/articles/vaccine-education-center/vaccines-fact.pdf>

Why are some vaccines given as a single dose and others as multiple doses? (Not a handout)

http://vec.chop.edu/service/vaccine-education-center/vaccine-safety/vaccines-and-immune-system.html#Why_are_some_vaccines

Vaccine Safety and Your Child: Separating Fact from Fiction (Booklet; Not a handout)

<http://vec.chop.edu/export/download/pdfs/articles/vaccine-education-center/vaccine-safety-eng.pdf>

Ari Brown, MD, FAAP

Clear Answers and Smart Advice about your Baby's Shots

<http://www.immunize.org/catg.d/p2068.pdf>

Resources for LHDs: Statistics Listed Under "Risk of Disease"/ "Benefit of Vaccination"

Centers for Disease Control (CDC)

Vaccine Information Statement on Rotavirus Vaccine, Note to Providers

<http://www.cdc.gov/vaccines/hcp/vis/vis-statements/rotavirus-hcp-info.pdf>

CDC: Measles Information

<http://www.cdc.gov/measles/>

Epidemiology and Prevention of Vaccine-Preventable Diseases (Pink Book), Measles Chapter

<http://www.cdc.gov/vaccines/pubs/pinkbook/meas.html>

MMWR: Prevention of Measles, Rubella, Congenital Rubella Syndrome, and Mumps, 2013: Summary Recommendations of the Advisory Committee on Immunization Practices (ACIP)

<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6204a1.htm>

Varicella Vaccine Effectiveness and Duration of Protection

<http://www.cdc.gov/vaccines/vpd-vac/varicella/hcp-effective-duration.htm>