VACCINE TRUTHS AND CONSEQUENCES

Scott Goldstein, M.D., F.A.A.P.
The Northwestern Children’s Practice
Instructor of Clinical Pediatrics
Northwestern University School of Medicine
Chicago, Illinois
DISCLOSURES

- I have no relevant financial relationships with the manufacturer(s) of any commercial products(s) and/or provider(s) of commercial services discussed within this CME activity.

- I do NOT intend to discuss an unapproved or investigative use of a commercial product/device in my presentation.
OBJECTIVES

- To discuss currently recommended vaccines and the diseases they prevent
- To address some of the most common questions about vaccines
- To provide resources for answering additional questions
VACCINES - 1974

- 2 months: Diphtheria, Tetanus, Pertussis (DTP), TOPV (trivalent oral polio virus)
- 4 months: DTP, TOPV
- 6 months: DTP, TOPV
- 1 year: Measles, TB test
- 1-12 years: Rubella, Mumps
- 1 1/2 years: DTP, TOPV
- 4-6 years: DTP, TOPV
Vaccine Schedule 2014
# 2013 Schedule 7-18 Years

## 2013 Recommended Immunizations for Children from 7 Through 18 Years Old

<table>
<thead>
<tr>
<th>7–10 YEARS</th>
<th>11–12 YEARS</th>
<th>13–18 YEARS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tdap</strong>&lt;sup&gt;1&lt;/sup&gt;</td>
<td><strong>Tetanus, Diphtheria, Pertussis (Tdap) Vaccine</strong></td>
<td><strong>Tdap</strong></td>
</tr>
<tr>
<td><strong>MCV4</strong></td>
<td><strong>Human Papillomavirus (HPV) Vaccine (3 Doses)</strong>&lt;sup&gt;2&lt;/sup&gt;</td>
<td><strong>HPV</strong></td>
</tr>
<tr>
<td><strong>Influenza (Yearly)</strong>&lt;sup&gt;3&lt;/sup&gt;</td>
<td><strong>Meningococcal Conjugate Vaccine (MCV4): Dose 1</strong>&lt;sup&gt;1,4&lt;/sup&gt;</td>
<td><strong>MCV4 Dose 1</strong>&lt;sup&gt;1,4&lt;/sup&gt;</td>
</tr>
<tr>
<td><strong>Pneumococcal Vaccine</strong>&lt;sup&gt;5&lt;/sup&gt;</td>
<td><strong>Hepatitis A (HepA) Vaccine Series</strong>&lt;sup&gt;6&lt;/sup&gt;</td>
<td><strong>Measles, Mumps, Rubella (MMR) Vaccine Series</strong></td>
</tr>
<tr>
<td><strong>Hepatitis B (HepB) Vaccine Series</strong></td>
<td><strong>Inactivated Polio Vaccine (IPV) Series</strong></td>
<td><strong>Varicella Vaccine Series</strong></td>
</tr>
</tbody>
</table>

These shaded boxes indicate when the vaccine is recommended for all children unless your doctor tells you that your child cannot safely receive the vaccine.

These shaded boxes indicate the vaccine should be given if a child is catching up on missed vaccines.

These shaded boxes indicate the vaccine is recommended for children with certain health conditions that put them at high risk for serious diseases. Note: healthy children can get the HepA series.<sup>1</sup> See vaccine-specific recommendations at www.cdc.gov/vaccines/public/ACIP-list.htm.

## Footnotes

1. Tdap vaccine is a combination vaccine that is recommended at age 11 or 12 to protect against tetanus, diphtheria, and pertussis. If your child has not received any or all of the DTP vaccine series, or if you don’t know if your child has received these shots, your child needs a single dose of Tdap when they are 7–10 years old. Talk to your child’s health care provider to find out if they need additional catch-up vaccines.

2. All 11 or 12 year olds—both girls and boys—should receive 3 doses of HPV vaccine to protect against HPV-related disease. Either HPV vaccine (Cervarix<sup>6</sup> or Gardasil<sup>7</sup>) can be given to girls and young women; only one HPV vaccine (Gardasil<sup>7</sup>) can be given to boys and young men.

3. Meningococcal conjugate vaccine (MCV) is recommended at age 11 or 12. A booster shot is recommended at age 16. Teens who received MCV for the first time at age 13 through 15 years will need a one-time booster dose between the ages of 16 and 18 years. If your teenager missed getting the vaccine altogether, ask their health care provider about getting it now, especially if your teenager is about to move into a college dorm or military barracks.

4. Everyone 6 months of age and older—including pregnant and teens—should get a flu vaccine every year. Children under the age of 9 years may require more than one dose. Talk to your child’s health care provider to find out if they need more than one dose.

5. A single dose of Pneumococcal Conjugate Vaccine (PCV13) is recommended for children who are 6–18 years old with certain medical conditions that place them at high risk. Talk to your health care provider about pneumococcal vaccine and what factors may place your child at high risk for pneumococcal disease.

6. Hepatitis A vaccination is recommended for older children with certain medical conditions that place them at high risk. HepA vaccine is licensed, safe, and effective for all children of all ages. Even if your child is not at high risk, you may decide you want your child protected against HepA. Talk to your health care provider about HepA vaccine and what factors may place your child at high risk for HepA.

For more information, call toll free 1-800-CDC-INFO (1-800-232-4636) or visit http://www.cdc.gov/vaccines/teens
IMMUNIZATIONS IN THE FIRST 2 YEARS

- Hepatitis B
- Diphtheria
- Tetanus
- Pertussis
- Haemophilus influenza type b
- Streptococcus Pneumonia
- Polio
- Rotavirus
- Influenza
- Varicella (Chicken Pox)
- Measles
- Mumps
- Rubella
- Hepatitis A
VACCINE PREVENTABLE DISEASES – FIRST 2 YEARS

- Who gets it?
- What does the disease do? What does the vaccine do? What happens if children don’t get vaccinated?
- When are they most likely to get infected?
- Where does the vaccine come from?
- Why do we use the vaccine?
- How does the vaccine benefit children?
Hepatitis B

- **What is it?**
  - A very contagious, silent infection. 100x more infectious than HIV. More likely to cause cancer than anything other than tobacco.

- **Who gets it?**
  - Spread through body fluids, but many of those who get it have no known exposure. Around 5000 children are infected in the US every year.

- **Why vaccinate babies?**
  - Complications from Hepatitis B are far more likely to develop in infants and young children than they are in adults (90% vs. 10%).

- **When is it given?**

- **What are the side effects?**
  - Soreness, fever, irritability for a day or two. Very rare allergic reaction.
DTaP

What are these?
- Diphtheria
- Tetanus
- Pertussis = Whooping cough = main reason for vaccine

Who gets infected?
- Almost nobody gets diphtheria or tetanus, but around a million get pertussis in US every year, and it is especially serious in infants

Who gets the vaccine?
- Given at 2, 4, 6, 15 months, booster at age 4 and 11. All adults should also get vaccinated. Women with each pregnancy.

How effective is the vaccine?
- Example – dramatic increase in pertussis cases and deaths when vaccine stopped in Japan in 1970’s

What are the side effects?
- Side effects much lower with current vaccine

Why is pertussis still so common?
**Hib**

- **What is it?**
  - Haemophilus influenza type b. Not “the flu”

- **Who gets it?**
  - Before 1980, 1 in 200 children would be severely infected by it (pneumonia, blood infection, brain infection)

- **How has it helped children?**
  - 99% reduction in severe disease since vaccine introduced! Most HCP’s will never see a severe case
IPV (Polio)

- What is polio?
- Why do we still vaccinate against it?
  - Only 3 countries that still see polio, but it could resurge if we don’t vaccinate
Streptococcus Pneumonia

- **What is it?**
  - Now the most common cause of bacterial meningitis. Also causes pneumonia, blood infections, ear infections.

- **How does the vaccine work?**
  - Like most vaccines, it makes the body think it is getting infected, but by using a killed, non-infectious version of the bacteria.

- **Who benefits from this vaccine?**
  - While the pneumococcal vaccine is very effective at preventing severe disease, it also reduces ear infections and need for ear tubes.
What is rotavirus?
When is the vaccine given?
How has the vaccine helped?
  - Rotavirus vaccine could save millions of lives worldwide
What were some initial concerns about this vaccine?
  - Example of how the regulatory agencies react when there is a legitimate concern about a vaccine
**Varicella (Chicken Pox)**

- What is chicken pox?
- Why do we vaccinate against it if it is so “benign”?
  - Unfortunately it is can also be deadly!
- Why do people still get chicken pox?
  - No vaccine is 100% effective, so we still see chicken pox (although it is usually very mild, and without the complications that can develop with naturally acquired disease)
- When is the vaccine given?
HEPATITIS A

- **What is Hepatitis A?**
  - Usually causes stomach flu-like symptoms, mainly in adults.

- **Who does it infect?**

- **Why do we vaccinate infants against it?**
  - Hep A is spread from children to adults, and adults can develop severe infections.
Influenza

- What is influenza?
  - It is NOT the stomach flu

- Who gets influenza?
  - Almost everyone will, eventually

- Who should get vaccinated, and what type of vaccine should they get?
  - There are 2 types of vaccines – live (nasal), and injected (shot), each works against 3 or 4 strains of influenza.

- How effective is the vaccine?
  - Depends on the season, but it is always more effective than not getting it!

- What are the side effects of the flu vaccine?
  - You cannot get the flu from the flu shot!!
MEASLES, MUMPS, AND RUBELLA

- What are these diseases?
- Who gets vaccinated? When?
- What are the side effects?
- How effective is this vaccine?
- Why are parents scared of this vaccine?
1. Does MMR Cause Autism?

- History of the controversy - the Wakefield Studies. Scientifically and ethically flawed, now completely discredited.
- Evidence compiled since 1998 overwhelmingly shows no link between MMR and autism.
- Recent (February 2009) developments - vaccine court reveals no link - “It is abundantly clear…..theories of causation were speculative and unpersuasive.”
- Several studies have found against the idea of “the light going out.”
- Wakefield medical license taken away in May 2010.
EXAMINE THE EVIDENCE

- Study in English children before and after 1988 (vaccine introduced) - no difference in autism b/t immunized and unimmunized
- 1988-1999 England - Rate of autism increases 7x, MMR rate same
- 537,000 Children in Denmark b/t 1991 - 98 - no difference in autism
- 535,000 Children in Finland - no difference in autism
- MMR stopped in Japan in 1993. Between 1988 - 1993, immunization rate fell from 70% - 2%, but rate of autism doubled
- 2004 study in Atlanta - no difference in autism among vaccinated and unvaccinated children
- California study - b/t 1980 - 1994, rate of autism increased 373%, immunization coverage only increased by 14%
- June 2010 study in Pediatrics - “Timely vaccination during infancy has no adverse effect on neuropsychological outcomes 7 - 10 years later

2004 study in Atlanta - no difference in autism among vaccinated and unvaccinated children
California study - b/t 1980 - 1994, rate of autism increased 373%, immunization coverage only increased by 14%
June 2010 study in Pediatrics - “Timely vaccination during infancy has no adverse effect on neuropsychological outcomes 7 - 10 years later
2. What is autism?

- Criteria for diagnosis changed in 2013. Much more specific diagnosis:
  - deficits in social communication and interaction
  - restricted, repetitive behaviors, interests, or activities
  - symptoms must be present in early childhood
  - symptoms together limit and impair everyday functioning

- No more PDD-NOS, no more Asperger’s
3. WHAT CAUSES AUTISM, AND WHY IS IT SO COMMON?

- Possible components of cause:
  - Genetics
  - Abnormal Brain Growth
  - Environmental Trigger
  - Prematurity

- Possible reasons for rise:
  - Calling one diagnosis another
  - Changing criteria for diagnosis
  - Better awareness, earlier diagnosis
  - Social acceptance
  - Over- and misdiagnosis
4. WHERE ARE THE “STUDIES”?  

- Institute of Medicine 2011 report on adverse effects of vaccines
- Very detailed look at all available evidence. Conclusive evidence that MMR (and vaccines in general) do not cause autism.
- Anyone who wants to “see the studies” should read this 900 page book
5. WHERE DOES THE SCHEDULE COME FROM?

- ACIP (Advisory Committee on Immunization Practices)
  - 15 voting members, many subcommittees.
  - [http://www.cdc.gov/vaccines/recs/acip/meetings.htm#li](http://www.cdc.gov/vaccines/recs/acip/meetings.htm#li) - meetings and transcripts are open to the public.
  - Often takes decades for vaccines to get approved.
6. SHOULD I SEPARATE THE MMR VACCINE?

- There is no reason to do this
- Separate components no longer made in US
- MMR is not, nor has it ever been, linked to autism
- No country in the world recommends splitting the vaccine
- The reported rise in autism is due to several factors, none of which involve vaccines
- We don’t know what exactly causes autism, but vaccines have been extensively studied and shown not to be a cause
7. What do courts say about vaccines and autism?

- “Vaccine Court” - started in 1998, funded by taxes on vaccines, decisions based on preponderance of evidence, not proof beyond reasonable doubt.
- In the summer of 2008, the court compensated the family of a 9-year-old girl with an underlying rare medical disorder with symptoms similar to autism, saying that it was possible that vaccines exacerbated the disorder - NOT that vaccines cause autism!
- [http://www.uscfc.uscourts.gov/node/5026](http://www.uscfc.uscourts.gov/node/5026) is a link to the 2/2009 decisions from the court strongly ruling against any link between MMR, thimerosal, and autism.
8. ARE VACCINES SAFE?

- If safe = harmless, then no vaccine is 100% safe. But very few things are harmless.
- If safe = preserving from a real danger, then vaccines are very safe.
- For all vaccines, the benefits far outweigh the risks.
- We have seen how quickly vaccines are pulled when true concerns arise (1st rotavirus).
- There is a system in place (VAERS - www.vaers.hhs.gov) where any patient or clinician can report concerns about vaccines.
9. ARE VACCINES NECESSARY?

- Vaccines are a victim of their own success - most people have never seen many of the diseases the vaccines prevent.

- Vaccines should be given because:
  - Some diseases are so common in this country (pertussis, rotavirus, influenza) that not immunizing children puts them at risk for the disease
  - Some diseases are present at low levels (measles, mumps, rubella) that not immunizing will lead to disease outbreaks and deaths
  - Some diseases have been virtually eliminated from the US (diphtheria, polio), but are present in other parts of the world and could potentially be reintroduced by commonplace international travel
10. ARE INFANTS TOO YOUNG FOR IMMUNIZATIONS?

- Infants are immunized because infancy is when they are most vulnerable to many diseases. For example:
  - Almost all of the deaths from pertussis in the US are in children under 6 months
  - Children under 2 years old are 500x more likely to get Hib meningitis if someone with a Hib infection is living in the home
  - 90% of newborns of mothers infected with Hep B will develop chronic liver disease

- Infants are born with fully responsive immune systems
11. **Can my baby handle so many shots at once?**

- A baby is born with the potential to make millions and millions of antibodies.
- Babies are exposed to millions of germs every day.
- 1900 - 1 shot, 200 proteins
- 1960 - 3 shots, 3217 proteins
- 1980 - 3 shots, 3000 proteins
- 2000 - 8 shots, 130 proteins
- A single bacteria on a toy can produce 3,000 proteins that the immune system needs to react against!
- Due to new combination vaccines, the number of shots is decreasing.
- There is no difference in immune response to a vaccine if it is given alone or in combination with other vaccines.
12. IS IT BETTER TO BE NATURALLY INFECTED?

“Natural” infection does almost always cause better immunity than vaccination (except for Hib, pneumococcal, and tetanus), and it does so after just one infection.

However, this comes at a much higher price, such as:

- Paralysis from natural polio
- Brain damage from natural Hib and pneumococcal infection
- Liver failure from natural Hep B
- Deafness and sterility from natural mumps
13. **DO VACCINES WEAKEN THE IMMUNE SYSTEM?**

- Natural infection with some viruses and bacteria does make the body less able to fight off infections from other viruses and bacteria.

- This is not the case with vaccines - the viruses and bacteria in vaccines are so disabled that they cannot weaken the immune system.

- Vaccinated children are not at greater risk of other infections than unvaccinated children.
14. IS IT SAFER TO DELAY OR STAGGER SHOTS?

- Vaccines are given early in life because, for most of them, the diseases that they prevent can severely affect infants.
- There is no good reason to “stagger” shots.
- If you want to use the “Sears Schedule”, you should actually read the book!
- Sears schedule = 19 office visits, vs. 9 office visits with AAP schedule.
- My problems with “Dr. Bob’s Alternative Vaccine Schedule”.
- Why would spreading out vaccines lead to less adverse events?
- Salon.com 10/13/2010 “Facing Off With the Vaccine Guru”
15. **What else is in the shots? Should vaccines be “greener”?**

- There are many components to vaccines, and they all serve a purpose. Most are present in much higher amounts in the environment.
- Thimerosal - Not used in vaccines that kids under 2 receive anymore (except some flu vaccine), and the rate of autism keeps increasing.
- Aluminum - There is way more aluminum in formula and breastmilk than in vaccines. Vaccines that contain Aluminum cause more soreness and redness, but there is no evidence that there are any other negative effects.
- Formaldehyde - No concerns for bad effects.
- MSG - Very small amounts, no bad effects.
16. **How can I prepare myself and my child for shots?**

- Read the Vaccine Information Statements
- Prepare questions before visit
- Bring a favorite toy, blanket, book
- Stay calm, talk softly
- Distract during shots (talk, sing)
- Nurse or give bottle after shots
- Cool washcloths on legs, Tylenol if needed
17. **Which vaccines are required for school?**

- For public and private schools in Illinois, DTaP, IPV, MMR, Chicken Pox, Hib, and Hep B.
  - Pneumococcal, Rotavirus, flu, and Hep A are not required.
- Illinois does not allow for philosophical exemptions - only Medical or Religious.
  - Religious objections are validated by the local school board.
- You can choose not to immunize if you have proof of immunity (blood test or doctor’s note for Varicella, Mumps).
RESOURCES

- [www.cdc.gov/vaccines](http://www.cdc.gov/vaccines)
- [www.cispimmunize.org](http://www.cispimmunize.org) - AAP’s vaccine info site
- [www.immunizationinfo.org](http://www.immunizationinfo.org) - National Network for Immunization Information. Affiliate of AAP, American Acad of Pediatric/Adult Infectious diseases, ACOG
- [www.chop.edu/consumer/jsp/microsite/microsite.jsp?id=75918](http://www.chop.edu/consumer/jsp/microsite/microsite.jsp?id=75918) - Children’s Hospital of Philadelphia Vaccine Education Center
- [www.vaccinesafety.edu](http://www.vaccinesafety.edu) - Johns Hopkins Institute for Vaccine Safety
- [www.immunize.org](http://www.immunize.org) - Funded by CDC.
- [www.VAERS.HHS.gov](http://www.VAERS.HHS.gov) - The Vaccine Adverse Events Reporting System
- [www.idph.state.il.us/about/shots.htm](http://www.idph.state.il.us/about/shots.htm) - Illinois dept. of Public Health site on vaccines
- Vaccine Information Statements
Resources

Reliable Sources of Immunization Information:
Where to go to find answers!

**Websites**

- American Academy of Pediatrics (AAP)
  www.aap.org/immunization
  AAP’s child immunization website contains information for both parents and clinicians.

- Centers for Disease Control and Prevention (CDC)
  www.cdc.gov/immunization
  The information on the website ranges from official vaccine schedules to information for the general public about vaccines.

- Every Child by Two (ECBT)
  www.ecbt.org
  ECBT, founded by Rosalyn Carter and Baby2Baby, has created three free websites. Each contains a broad array of educational materials and information about vaccines, their safety, and research on science, vaccine recommendations, and many other topics to help decisions and parents.

- Immunization Action Coalition (IAC)
  www.immunize.org
  IAC is a nonprofit organization that promotes immunization for all people against vaccine-preventable diseases. These websites offer educational materials, photos, and videos clips for parents, healthcare professionals, the media, and the general public.

- National Network for Immunization Information (NNII)
  www.immunizeinfo.org
  Google search
  NNII provides parent-reviewed, current, extensively reviewed information to healthcare professionals, the media, policy makers, and the public.

**Phone Numbers**

- CDC-INFO Contact Center
  A toll-free number for consumers and healthcare professionals who have questions about immunization and vaccine-preventable diseases.
  Call (800) CDC-INFO or (888) 232-4636. The Center operates 24/7 in English & Spanish. TTY: (888) 222-6346.

**Books for Parents**

- *Baby 411, 4th edition*
  By Denise Fields and Anna Brown, MD
  Windmill Press, 2006. Written by a Harvard-trained pediatrician (Brown) and the author of the best-selling *Baby 411* (Fields), this book is the ultimate compilation of frequently asked questions for baby’s first year. It includes a special section on vaccines. To purchase, visit your local bookseller or www.davieshealth.com

- *Parents’ Guide to Childhood Immunization, 2010*
  This 68-page booklet from CDC introduces parents to 14 childhood diseases and the 10 vaccines that can protect children from them. Parents can order a free booklet or print their own copy by visiting www.cdc.gov/vaccines/hcp/parents-guide (coming soon in 2013)

**Vaccines**

- *Vaccines: What You Should Know, 3rd edition*
  By Paul Offit, MD and Paul Plotz, MD
  John Wiley & Sons, Inc., 2013
  This third edition was written to help parents sort through the latest information about vaccines to determine what is right for their family. It includes a discussion of vaccines and autism, memory in vaccines, and the ability of children to tolerate receiving numerous vaccines at once. To purchase, visit your local bookseller or www.wiley.com

**Videos**

- "Vaccines and Your Baby" and "Vaccines: Separating Fact from Fear"
  Available for a nominal charge in English and Spanish (in VHS and DVD formats). These videos answer many questions new parents have. Ordering information is available at www.cdc.gov/vaccines/hcp/educators/videos/usa/ or parents can watch the videos online at www.healthychildren.org/vaccines-education/healthy-children-richmedia.html

---

Immunization Action Coalition • 4157 Sibley Ave • St Paul, MN 55104 • (651) 444-7988 • www.immunize.org • www.immunkids.org
THANK YOU FOR LISTENING!